## **Bibliography**

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 $\oplus$ 

- M. Achenbach, "A model for an alloy with shape memory," International Journal of Plasticity, 5, pp. 371–395, 1989.
- [2] M. Achenbach and I. Müller, "Simulation of material behavior of alloys with shape memory," Archives of Mechanics, 37(6), pp. 573–585, 1985.
- [3] C.J. Adkins, *Equilibrium Thermodynamics*, Cambridge University Press, Cambridge, UK, 1994.
- [4] A. Aharoni, Introduction to the Theory of Ferromagnetism, Second Edition, Oxford University Press, Oxford, UK, 2000.
- [5] A. Aharoni, "Micromagnetics: Past, present and future," *Physica B*, 306, pp. 1–9, 2001.
- [6] R. Ahluwalia and W. Cao, "Influence of dipolar defects on switching behavior in ferroelectrics," *Physical Review B*, 63(1), article 012103, 2000.
- [7] S. Aizawa, T. Kakizawa and M. Higasino, "Case studies of smart materials for civil structures," *Smart Materials and Structures*, 7, pp. 617–626, 1998.
- [8] K. Aizu, "Possible species of ferromagnetic, ferroelectric, and ferroelastic crystals," *Physical Review B*, 2(3), pp. 754–772, 1970.
- [9] M.A. Akbas and P.K. Davies, "Domain growth in Pb(Mg<sub>1/3</sub> Nb<sub>2/3</sub>)O<sub>3</sub> perovskite relaxor ferroelectric oxides," *Journal of the American Ceramic Society*, 80(11), pp. 2933–2936, 1989.
- [10] Ó. Alejos and E. Della Torre, "Magnetic aftereffect dependence on the moving parameter of the Preisach model," *Physica B*, 306, pp. 67–71, 2001.
- [11] E.H. Anderson and N.W. Hagood, "Self-sensing piezoelectric actuation: Analysis and application to controlled structures," AIAA/ASME/ASCE/AHS/ ASC Structures, Structural Dynamics and Materials Conference, Dallas, TX, pp. 2141–2155, 1992.
- [12] J.C. Anderson, *Dielectrics*, Reinhold Publishing Corporation, New York, 1964.

- W.D. Armstrong, "Magnetization and magnetostriction processes in Tb<sub>0.27-0.30</sub> Dy<sub>0.73-0.70</sub> Fe<sub>1.9-2.0</sub>," Journal of Applied Physics, 81(5), pp. 2321-2326, 1997.
- [14] D.N. Arnold and R.S. Falk, "A uniformly accurate finite element for the Reissner-Mindlin plate," SIAM Journal of Numerical Analysis, 26, pp. 1276– 1290, 1989.
- [15] V.I. Arnold, Mathematical Methods in Classical Mechanics, Second Edition, Translated by K. Vogtmann and A. Weinstein, Springer-Verlag, New York, 1989.
- [16] M. Ashhab, M.V. Salapaka, M. Dahleh and I. Mezic, "Dynamical analysis and control of micro-cantilevers," *Automatica*, 35(10), pp. 1663–1670, 1999.
- [17] D.L. Atherton and J.R. Beattie, "A mean field Stoner-Wohlfarth hysteresis model," *IEEE Transactions on Magnetics*, 26(6), pp. 3059–3063, 1990.
- [18] D.L. Atherton, B. Szpunar and J.A. Szpunar, "A new approach to Preisach diagrams," *IEEE Transactions on Magnetics*, 23(3), pp. 1856–1865, 1987.
- [19] K.E. Atkinson, An Introduction to Numerical Analysis, John Wiley and Sons, New York, 1978.
- [20] O. Axelsson and V.A. Barker, *Finite Element Solution of Boundary Value Problems*, SIAM Classics in Applied Mathematics, SIAM, Philadelphia, 2001.
- [21] I. Babuška and M. Suri, "On locking and robustness in the finite element method," SIAM Journal of Numerical Analysis, 29(5), pp. 1261–1293, 1992.
- [22] I. Babuška and M. Suri, "Locking effects in the finite element approximation of elasticity problems," *Numerische Mathematik*, 62, pp. 439–463, 1992.
- [23] C.A. Balanis, Advanced Engineering Electromagnetics, John Wiley and Sons, New York, 1989.
- [24] B.L. Ball and R.C. Smith, "A stress-dependent hysteresis model for PZTbased transducers," Smart Structures and Materials 2004, Proceedings of the SPIE, Volume 5383, pp. 23–30, 2004.
- [25] B.L. Ball, R.C. Smith and Z. Ounaies, "A dynamic model for THUNDER transducers," Smart Structures and Materials 2003, Proceedings of the SPIE, Volume 5049, pp. 100–111, 2003.
- [26] H.T. Banks, K. Ito and Y. Wang, "Well-posedness for damped second order systems with unbounded input operators," *Differential and Integral Equations*, 8, pp. 587–606, 1995.
- [27] H.T. Banks, F. Kappel and C. Wang, "Weak solutions and differentiability for size structured population models," in *Distributed Parameter Systems: Control and Applications*, F. Kappel et al, Eds., ISNM Vol. 100, Birkhäuser, pp. 35–50, 1991.

 $\oplus$ 

- [28] H.T. Banks, A.J. Kurdila and G. Webb, "Identification of hysteretic control influence operators representing smart actuators, Part I: formulation," *Mathematical Problems in Engineering*, 3, pp. 287–328, 1997.
- [29] H.T. Banks, A.J. Kurdila and G. Webb, "Identification of hysteretic control influence operators representing smart actuators, Part II: convergent approximations," *Journal of Intelligent Material Systems and Structures*, 8(6), pp. 536–550, 1997.
- [30] H.T. Banks, R.C. Smith, D.E. Brown, V.L. Metcalf and R.J. Silcox, "The estimation of material and patch parameters in a PDE-based circular plate model," *Journal of Sound and Vibration*, 199(5), pp. 777–799, 1997.
- [31] H.T. Banks, R.C. Smith, D.E. Brown, R.J. Silcox, and V.L. Metcalf, "Experimental confirmation of a PDE-based approach to design of feedback controls," *SIAM Journal on Control and Optimization*, 35(4), pp. 1263-1296, 1997.
- [32] H.T. Banks, R.C. Smith and Y. Wang, "Modeling and parameter estimation for an imperfectly clamped plate," in *Computation and Control IV*, K.L. Bowers and J. Lund, Eds., Birkhäuser, Boston, pp. 23–42, 1995.
- [33] H.T. Banks, R.C. Smith and Y. Wang, Smart Material Structures: Modeling, Estimation and Control, Masson/John Wiley, Paris/ Chichester, 1996.
- [34] H.T. Banks and H.T. Tran, *Mathematical and Experimental Modeling of Physical and Biological Processes*, SIAM, Philadelphia, PA, to appear.
- [35] H. Barkhausen, "Two phenomena uncovered with help of the new amplifiers," Berichte der Deutschen Physikalischen Gesellschaft (later Zeitschrift für Physik), 20, pp. 401–403, 1919.
- [36] E.B. Becker, G.F. Carey and J.T. Oden, *Finite Elements: An Introduction; Volume 1*, Prentice–Hall, Inc., Englewood Cliffs, NJ, 1981.
- [37] D. Berlincourt, D.R. Curran and H. Jaffe, "Piezoelectric and piezomagnetic materials and their function in transducers," *Physical Acoustics*, Volume 1 (Part A), W.E. Mason, Ed., pp. 169–270, 1964.
- [38] D. Bernardini and T.J. Pence, "Shape-memory materials, modeling," in *Encyclopedia of Smart Materials*, M. Schwartz, Ed., John Wiley and Sons, New York, pp. 964–980, 2002.
- [39] M. Bernadou and J.M. Boisserie, *The Finite Element Method in Thin Shell Theory: Applications to Arch Dam Simulations*, Birkhäusser, Boston, 1982.
- [40] G. Bertotti, Hysteresis in Magnetism: For Physicists, Materials Scientists, and Engineers, Academic Press, San Diego, CA, 1998.
- [41] J.J. Binney, N.J. Dowrick, A.J. Fisher and M.E.J. Newman, The Theory of Critical Phenomena: An Introduction to the Renormalization Group, Clarendon Press, Oxford, UK, 1999.

- [42] R.R. Birss, C.A. Faunce and E.D. Isaac, "Magnetomechanical effects in iron and iron-carbon alloys," *Journal of Applied Physics D: Applied Physics*, 4, pp. 1040–1048, 1971.
- [43] F. Bitter, "On inhomogeneities in the magnetization of ferromagnetic materials," *Physical Review*, 38, pp. 1903–1905, 1931.
- [44] Z. Bo and D.C. Lagoudas, "Thermomechanical modeling of polycrystalline SMAs under cyclic loading, Part I: theoretical derivations," *International Journal of Engineering Science*, 37, pp. 1089–1140, 1999.
- [45] Z. Bo and D.C. Lagoudas, "Thermomechanical modeling of polycrystalline SMAs under cyclic loading, Part III: evolution of plastic strains and twoway shape memory effect," *International Journal of Engineering Science*, 37, pp. 1175–1203, 1999.
- [46] Z. Bo and D.C. Lagoudas, "Thermomechanical modeling of polycrystalline SMAs under cyclic loading, Part IV: modeling of minor hysteresis loops," *International Journal of Engineering Science*, 37, pp. 1205–1249, 1999.
- [47] C. Body, G. Reyne and G. Meunier, "Nonlinear finite element modelling of magneto-mechanical phenomena in giant magnetostrictive thin films," *IEEE Transactions on Magnetics*, 33(2), pp. 1620–1623, 1997.
- [48] R.T. Bonnecaze and J.F. Brady, "Dynamic simulation of an electrorheological fluid," *Journal of Chemical Physics*, 96, pp. 2183–2203, 1992.
- [49] O. Boser, "Statistical theory of hysteresis in ferroelectric materials," Journal of Applied Physics, 62(4), pp. 1344–1348, 1987.
- [50] J.G. Boyd and D.C. Lagoudas, "Thermomechanical response of shape memory composites," *Journal of Intelligent Material Systems and Structures*, 5, pp. 333–346, 1994.
- [51] R.M. Bozorth, *Ferromagnetism*, D. Van Nostrand Company, Inc., New York, 1951.
- [52] W.L. Bragg and E.J. Williams, "The effect of thermal agitation on atomic arrangement in alloys," *Proceedings of the Royal Society of London*, A145, pp. 699–730, 1934.
- [53] W.L. Bragg and E.J. Williams, "The effect of thermal agitation on atomic arrangement in alloys II," *Proceedings of the Royal Society of London*, A151, pp. 540–566, 1935.
- [54] S.C. Brenner and L.R. Scott, The Mathematical Theory of Finite Element Methods, Springer-Verlag, New York, 1994.

- [55] L.C. Brinson, "One-dimensional constitutive behavior of shape memory alloys: Thermomechanical derivation with non-constant material functions and redefined martensite internal variable," *Journal of Intelligent Material Systems and Structures*, 4, pp. 229–242, 1993.
- [56] D. Brooks, "Applicability of simplified expressions for design with electrorheological fluids," *Journal of Intelligent Material Systems and Structures*, 4, pp. 409–414, 1993.
- [57] M. Brokate and J. Sprekels, Hysteresis and Phase Transitions, Springer-Verlag, New York, 1996.
- [58] S.A. Brown, C.L. Hom, M. Massuda, J. Prodey, K. Bridger, N. Shankar and S.R. Winzer, "The electro-mechanical behavior of a Pb(Mg<sub>1/3</sub>,Nb<sub>2/3</sub>)O<sub>3</sub>-PbTiO<sub>3</sub>-BaTiO<sub>3</sub> relaxor ferroelectric: An experimental and analytical study," *Journal of the American Ceramic Society*, 79, pp. 2271–2282, 1996.
- [59] W.F. Brown, Jr., *Magnetostatic Principles in Ferromagnetism*, North– Holland Publishing Company, Amsterdam, 1962.
- [60] W.F. Brown, Jr., Magnetoelastic Interactions, Springer-Verlag, 1966.
- [61] W.F. Brown, Jr., "Domain, micromagnetics, and beyond, reminiscences and assessments, *Journal of Applied Physics*, 49, pp. 1937-1942, 1978.
- [62] W.J. Buehler, J.V. Gilfrich and R.C. Wiley, "Effect of low-temperature phase changes on the mechanical properties of alloys near composition NiTi," *Jour*nal of Applied Physics, 34(5), pp. 1475–1477, 1963.
- [63] W.J. Buehler and R.C. Wiley, Naval Ordnance Laboratory Report 61–75, 1961.
- [64] W.J. Buehler and R.C. Wiley, "Nitinols are nonmagnetic, corrosion resistant, hardenable," *Materials in Design Engineering*, 55(2), pp. 82–83, 1962.
- [65] B. Bundara, M. Tokuda, B. Kuselj, B. Ule and J.V. Tuma, "Superelastic tension and bending characteristics of shape memory alloys," *Metals and Materials*, 6(4), pp. 293–299, 2000.
- [66] S.E. Burke and J.E. Hubbard, Jr., "Spatial filtering concepts in distributed parameter control," ASME Journal of Dynamic Systems, Measurement, and Control, 112, pp. 565–573, 1990.
- [67] J.A. Burns, "Nonlinear distributed parameter control systems with nonnormal linearizations: Applications and approximations," in *Research Directions in Distributed Parameter Systems*, R.C. Smith and M.A. Demetriou, Eds., pp. 17–53, SIAM, Philadelphia, PA, 2003.
- [68] B. Burton, D. Nosse and M.J. Dapino, "High power density actuation through Terfenol-D resonant motion and magnetorheological flow control," Smart Structures and Materials 2004, Proceedings of the SPIE, Volume 5390, pp. 104–115, 2004.

- [69] S.A. Burton, N. Makris, I. Konstantopoulos and P.J. Antsaklis, "Modeling the response of ER damper: Phenomenology and emulation," ASCE Journal of Engineering Mechanics, 122(9), pp. 897–906, 1996.
- [70] J.L. Butler, S.C. Butler and A.E. Clark, "Unidirectional magnetostrictive/ piezoelectric hybrid transducer," *Journal of the Acoustical Society of America*, 88(1), pp. 7–11, 1990.
- [71] S.C. Butler and F.A. Tito, "A broadband hybrid magnetostrictive/ piezoelectric transducer array," OCEANS 2000 MTS/IEEE, Volume 3, pp. 1469–1475, 2000.
- [72] S. Büttgenbach, S. Bütefisch, M. Leester-Schädel and A. Wogersien, "Shape memory microactuators," *Microsystem Technologies*, 7, pp. 165–170, 2001.
- [73] W.G. Cady, *Piezoelectricity*, McGraw-Hill Book Company, Inc., New York, 1946.
- [74] F.T. Calkins and G.W. Butler, "Subsonic jet noise reduction variable geometry chevron," Proceedings of the 42nd AIAA Aerospace Sciences Meeting and Exhibit, 2004.
- [75] F.T. Calkins, R.C. Smith and A.B. Flatau, "An energy-based hysteresis model for magnetostrictive transducers," *IEEE Transactions on Magnetics*, 36(2), pp. 429–439, 2000.
- [76] W. Cao, S. Tavener and S. Xie, "Simulation of boundary condition influence in a second-order ferroelectric phase transition," *Journal of Applied Physics*, 86(10), pp. 5739–5746, 1999.
- [77] M. Capozzoli, J. Gopalakrishnan, K. Hogan, J. Massad, T. Tokarchik, S. Wilmarth, H.T. Banks, K.M. Mossi and R.C. Smith, "Modeling aspects concerning THUNDER actuators," Smart Structures and Materials 1999, Proceedings of the SPIE, Volume 3667, pp. 719–727, 1999.
- [78] J.D. Carlson, D.M. Catanzarite and K.A. St. Clair, "Commercial magnetorheological fluid devices," *International Journal of Modern Physics B*, 10(23 & 24), pp. 2857–2865, 1996.
- [79] J.D. Carlson and M.R. Jolly, "MR fluid, foam and elastomer devices," Mechatronics, 10, pp. 555–569, 2000.
- [80] J.D. Carlson and K.D. Weiss, "A growing attraction to magnetic fields," Machine Design, 66(15), pp. 61–64, 1994.
- [81] M.E. Caspari and W.J. Merz, "The electromechanical behavior of BaTiO<sub>3</sub> single-domain crystals," *Physical Review*, 80(6), pp. 1082–1089, 1950.

- [82] L.C. Chang and T.A. Read, "Plastic deformation and diffusionless phase changes in metals — the gold-cadmium beta phase," *Transactions of the American Institute of Mining and Metallurgical Engineers*, 191, pp. 47–52, 1951.
- [83] I.-W. Chen and Y. Wang, "A domain wall model for relaxor ferroelectrics," *Ferroelectrics*, 206, pp. 245–263, 1998.
- [84] J. Chen, H.M. Chan and M.P. Harmer, "Ordering structure and dielectric properties of undoped and La/Na-doped Pb(Mg<sub>1/3</sub> Nb<sub>2/3</sub>)O<sub>3</sub>," *Journal of* the American Ceramic Society, 72(4), pp. 593–598, 1989.
- [85] W. Chen and C.S. Lynch, "A model for simulating polarization switching and AF-F phase changes in ferroelectric ceramics," *Journal of Intelligent Material Systems and Structures*, 9, pp. 427–432, 1998.
- [86] W. Chen and C.S. Lynch, "A micro-electro-mechanical model for polarization switching of ferroelectric materials," *Acta Materialia*, 46(15), pp. 5303–5311, 1998.
- [87] X. Chen, D.N. Fang and K.C. Hwang, "Micromechanics simulation of ferroelectric polarisation switching," Acta Materialia, 45(8), pp. 3181–3189, 1997.
- [88] S. Chikazumi, *Physics of Ferromagnetism*, Second Edition, English edition prepared with the assistance of C.D. Graham, Jr., Clarendon Press, Oxford, 1997.
- [89] E.K.P. Chong and S.H. Żak, An Introduction to Optimization, John Wiley and Sons, New York, 1996.
- [90] H. Chopra, C. Ji and V. Kokorin, "Magnetic-field-induced twin boundary motion in magnetic shape-memory alloys," *Physical Review B*, 61, pp. 4913– 4915, 2000.
- [91] P.G. Ciarlet, *The Finite Element Method for Elliptic Problems*, SIAM Classics in Applied Mathematics, SIAM, Philadelphia, 2002.
- [92] A.E. Clark and H.S. Belson, "Giant room-temperature magnetostrictions in TbFe<sub>2</sub> and DyFe<sub>2</sub>," *Physical Review B*, 5, pp. 3642–3644, 1972.
- [93] A.E. Clark, J.B. Restorff, M. Wun-Fogle, T.A. Lograsso and D.L. Schlagel, "Magnetostrictive properties of body-centered-cubic Fe-Ga and Fe-Ga-Al alloys," *IEEE Transactions on Magnetics*, 36(5), pp. 3238–3240, 2000.
- [94] A.E. Clark, H.T. Savage and M.L. Spano, "Effect of stress on magnetostriction and magnetization of single crystal Tb<sub>.27</sub>Dy<sub>.73</sub>Fe<sub>2</sub>," *IEEE Transactions on Magnetics*, 20, pp. 1443–1445, 1984.

- [95] A.E. Clark, M. Wun-Fogle, J.B. Restorff, T.A. Lograsso, A.R. Ross and D.L. Schlagel, "Magnetostrictive Galfenol/Alfenol single crystal alloys under large compressive stresses," Proceedings of the 7th International Conference on New Actuators, H. Borgmann, Ed., Bremen, Germany, pp. 111, 2000.
- [96] R.L. Clark, R.A. Burdisso and C.R. Fuller, "Design approaches for shaping polyvinylidene fluoride sensors in active structural acoustic control (ASAC)," *Journal of Intelligent Material Systems and Structures*, 4, pp. 354–365, 1993.
- [97] R.L. Clark and S.E. Burke, "Practical limitations in achieving shaped modal sensors with induced strain materials," *Journal of Vibration and Acoustics*, 118, pp. 668–675, 1996.
- [98] R.L. Clark and C.R. Fuller, "Modal sensing of efficient acoustic radiators with polyvinylidene fluoride distributed sensors in active structural acoustic control approaches," *Journal of the Acoustical Society of America*, 91(6), pp. 3321– 3329, 1992.
- [99] R.L. Clark, W.R. Saunders and G.P. Gibbs, Adaptive Structures: Dynamics and Control, John Wiley and Sons, New York, 1998.
- [100] R.O. Claus, Ed., Fiber Optic Sensor-Based Smart Materials and Structures, Institute of Physics Publishing, Bristol, UK, 1992.
- [101] A.C.F. Cocks and R.M. McMeeking, "A phenomenological constitutive law for the behavior of ferroelectric ceramics," *Ferroelectrics*, 228, pp. 219–228, 1999.
- [102] R.E. Cohen, Ed., First-Principles Calculations for Ferroelectrics, American Institute of Physics, Woodbury, NY, 1998.
- [103] D.G. Cole and R.L. Clark, "Adaptive compensation of piezoelectric sensoriactuators," *Journal of Intelligent Material Systems and Structures*, 5, pp. 665– 672, 1994.
- [104] R. Courant and D. Hilbert, Methods of Mathematical Physics, Volumes 1 and 2, Springer–Verlag, Berlin, 1937; reprinted by John Wiley and Sons, New York, 1989.
- [105] D.J. Craik and R.S. Tebble, Ferromagnetism and Ferromagnetic Domains, North-Holland Publishing Company, Amsterdam, 1965.
- [106] D.J. Craik and M.J. Wood, "Magnetization changes induced by stress in a constant applied field," *Journal of Applied Physics D: Applied Physics*, 3, pp. 1009–1016, 1970.
- [107] D. Croft and S. Devasia, "Vibration compensation for high speed scanning tunneling microscopy," *Review of Scientific Instruments*, 70(12), pp. 4600– 4605, 1999.

- [108] D. Croft, G. Shed and S. Devasia, "Creep, hysteresis, and vibration compensation for piezoactuators: Atomic force microscopy application," *Journal of Dynamic Systems, Measurement, and Control*, 23, pp. 35–43, 2001.
- [109] L.E. Cross, "Relaxor ferroelectrics," Ferroelectrics, 76, pp. 241–267, 1987.
- [110] L.E. Cross, "Recent developments in piezoelectric ferroelectric materials and composites," Proceedings of the 4th European and 2nd MIMR Conference, G.R. Tomlinson and W.A. Bullough, Eds., Harrogate, UK, July 6-8, pp. 89– 97, 1998.
- [111] B.D. Cullity, Introduction to Magnetic Materials, Addison-Wesley, Reading, MA, 1972.
- [112] B. Culshaw, Optical Fibre Sensing and Signal Processing, Peter Peregrinus, London 1984.
- [113] B. Culshaw, Smart Structures and Materials, Artech House, Boston, 1996.
- [114] D. Damjanovic and R.E. Newnham, "Electrostrictive and piezoelectric materials for actuator applications," *Journal of Intelligent Material Systems and Structures*, 3, pp. 190–208, 1992.
- [115] A. Daniele, S. Salapaka, M.V. Salapaka and M. Dahleh, "Piezoelectric scanners for atomic force microscopes: Design of lateral sensors, identification and control," Proceedings of the America Control Conference, pp. 253–257, 1999.
- [116] M.J. Dapino, "On magnetostrictive materials and their use in adaptive structures," *International Journal of Structural Engineering and Mechanics*, 17(3-4), pp. 303–329, 2004.
- [117] M.J. Dapino, "Magnetostrictive materials," *Encyclopedia of Smart Materials*, M. Schwartz, Ed., John Wiley and Sons, New York, pp. 600–620, 2002.
- [118] M.J. Dapino, F.T. Calkins and A.B. Flatau, "Magnetostrictive devices," Wiley Encyclopedia of Electrical and Electronics Engineering, John G. Webster, Ed., John Wiley and Sons, Inc., New York, Volume 12, pp. 278–305, 1999.
- [119] M.J. Dapino, R.C. Smith, L.E. Faidley and A.B. Flatau, "A coupled structural-magnetic strain and stress model for magnetostrictive transducers," *Journal of Intelligent Material Systems and Structures*, 11(2), pp. 134–152, 2000.
- [120] M.J. Dapino, R.C. Smith and A.B. Flatau, "A structural strain model for magnetostrictive transducers," *IEEE Transactions on Magnetics*, 36(3), pp. 545–556, 2000.
- [121] G. DaPrato and P. Grisvard, Maximal regularity for evolution equations by interpolation and extrapolation, *Journal of Functional Analysis*, 58, 1984, pp. 107–124.

- [122] G. Daspit, C. Martin, J.-H. Pyo, C. Smith, H. To, K.M. Furati, Z. Ounaies and R.C. Smith, "Model development for piezoelectric polymer unimorphs," Smart Structures and Materials 2002, Proceedings of the SPIE, Volume 4693, pp. 514–524, 2002.
- [123] H.F. Davis, Fourier Series and Orthogonal Functions, Dover Publications, Inc., New York, 1963.
- [124] L.C. Davis, "Model of magnetorheological elastomers," Journal of Applied Physics, 85(6), pp. 3348–3351, 1999.
- [125] P.J. Davis and P. Rabinowitz, Numerical Integration, Blaisdell Publishing Company, Waltham, MA, 1967.
- [126] E. Della Torre, *Magnetic Hysteresis*, IEEE Press, New York, 1999.
- [127] E. Della Torre and L.H. Bennett, "A Preisach model for aftereffect," *IEEE Transactions on Magnetics*, 34(4), pp 1276–1278, 1998.
- [128] E. Della Torre, L.H. Bennett, R.A. Fry and Ó. Alejos, "Preisach–Arrhenius model for thermal aftereffect," *IEEE Transactions on Magnetics*, 38(5), pp. 3409–3416, 2002.
- [129] E. Della Torre and F. Vajda, "Parameter identification of the complete moving hysteresis model using major loop data," *IEEE Transactions on Magnetics*, 30(6), pp. 4987–5000, 1994.
- [130] R.C.H. del Rosario and R.C. Smith, "Spline approximation of thin shell dynamics," *International Journal for Numerical Methods in Engineering*, 40, pp. 2807–2840, 1997.
- [131] R.C.H. del Rosario and R.C. Smith, "LQR control of thin shell dynamics: Formulation and numerical implementation," *Journal of Intelligent Material Systems and Structures*, 9(4), pp. 301–320, 1998.
- [132] M.A. Demetriou, "Integrated actuator-sensor placement and hybrid controller design of flexible structures under worst case spatiotemporal disturbance variations," *Journal of Intelligent Material Systems and Structures*, to appear.
- [133] R. DesRoches and M. Delemont, "Seismic retrofit of simply supported bridges using shape memory alloys," *Engineering Structures*, 24, pp. 325–332, 2002.
- [134] A.F. Devonshire, "Theory of ferroelectrics," *Philosophical Magazine*, 3(10), pp. 85–130, 1954.
- [135] J. Dosch, D.J. Inman, and E. Garcia, "A self-sensing piezoelectric actuator for collocated control, *Journal of Intelligent Material Systems and Structures*, 3, pp. 166–185, 1992.

 $\oplus$ 

- [136] P.R. Downey, M.J. Dapino and R.C. Smith, "Analysis of hybrid PMN/ Terfenol broadband transducers in mechanical series configuration," Smart Structures and Materials 2003, Proceedings of the SPIE, Volume 5049, pp. 168–179, 2003.
- [137] M.E. Drougard, "Detailed study of switching current in barium titanate," Journal of Applied Physics, 31(2), pp. 352–355, 1960.
- [138] T.A. Duenas and G.P. Carman, "Large magnetostrictive response of Terfenol-D resin composites," *Journal of Applied Physics*, 87(9), pp. 4696–4701, 2000.
- [139] T.A. Duenas, L. Hsu and G.P. Carman, "Magnetostrictive composite material systems analytical/experimental," Materials Research Society Symposium Proceedings, 459, pp. 527–543, 1997.
- [140] T.W. Duerig, "The use of superelasticity in modern medicine," MRS Bulletin, 27(2), pp. 101–104, 2002.
- [141] T.W. Duerig, A. Pelton and D. Stöckel, "An overview of nitinol medical applications," *Materials Science and Engineering: A, Structural Materials: Properties, Microstructure and Processing*, Volumes 273–275, pp. 149–160, 1999.
- [142] J.S. Dugdale, Entropy and its Physical Meaning, Taylor and Francis, London, UK, 1996.
- [143] E. du Trémolet de Lacheisserie, Magnetostriction: Theory and Applications of Magnetoelasticity, CRSC Press, Boca Raton, FL, 1993.
- [144] S.J. Dyke, B.F. Spencer, M.K. Sain and J.D. Carlson, "An experimental study of MR dampers for seismic protection," *Smart Materials and Structures*, 7, pp. 693–703, 1998.
- [145] C.L. Dym, Introduction to the Theory of Shells, Pergamon Press, New York, 1974.
- [146] M.A. Ealey and J.F. Washeba, "Continuous facesheet low voltage deformable mirrors," Optical Engineering, 29(10), pp. 1191–1198, 1990.
- [147] B. Edmonds, Jr., J. Ernstberger, K. Ghosh, J. Malaugh, D. Nfodjo, W. Samyono, X. Xu, D. Dausch, S. Goodwin and R.C. Smith, "Electrostatic operation and curvature modeling for a MEMs flexible film actuator," Smart Structures and Materials 2004, Proceedings of the SPIE, Volume 5383, pp. 134–143, 2004.
- [148] R.E. Edwards, Functional Analysis: Theory and Applications, Dover, New York, 1995.
- [149] K. Elliot. "Titan vibroacoustics," Proceedings of the NASA-Industry Conference on Launch Environments of ELV Payloads, Elkridge, MD, pp. 189–215, 1990.

- [150] H.W. Engl, M. Hanke and A. Neubauer, *Regularization of Inverse Problems*, Kluwer Academic Publishers, Dordrecht; Boston, 1996.
- [151] D.H. Everett, "A general approach to hysteresis. Part 3: a formal treatment of the independent domain model of hysteresis," *Transactions of the Faraday Society*, 50, pp. 1077–1096, 1954.
- [152] D.H. Everett, "A general approach to hysteresis. Part 4: an alternative formulation of the domain model," *Transactions of the Faraday Society*, 51, pp. 1551–1557, 1955.
- [153] D.H. Everett and F.W. Smith, "A general approach to hysteresis. Part 2: development of the domain theory," *Transactions of the Faraday Society*, 50, pp. 187–197, 1954.
- [154] D.H. Everett and W.I. Whitton, "A general approach to hysteresis," Transactions of the Faraday Society, 48, pp. 749–757, 1952.
- [155] R. Fahroo and Y. Wang, "Optimal location of piezoceramic actuators for vibration suppression of a flexible structure," Proceedings of the 36th IEEE Conference on Decision and Control, pp. 1966–1971, 1997.
- [156] L.E. Faidley, M.J. Dapino, G.N. Washington, R.C. Smith and T.A. Lograsso, "Analytical and experimental issues in Ni-Mn-Ga transducers," Smart Structures and Materials 2003, Proceedings of the SPIE, Volume 5049, pp. 1–12, 2003.
- [157] F. Falk, "Model free energy, mechanics, and thermodynamics of shape memory alloys," Acta Metallurgica, 28, pp. 1773–1780, 1980.
- [158] F. Falk, "Ginzburg-Landau theory of static domain walls in shape-memory alloys," Zeitschrift für Physik, B, Condensed Matter, 51, pp. 177–185, 1983.
- [159] F. Falk, "One-dimensional model of shape memory alloys," Archives of Mechanics, 35(1), pp. 63–84, 1983.
- [160] V.N. Fedosov and A.S. Sidorkin, "Quasielastic displacements of domain boundaries in ferroelectrics," *Soviet Physics Solid State*, 18(6), pp. 964–968, 1976.
- [161] R.P. Feynman, R.B. Leighton and M. Sands, *Lectures on Physics*, Volume 2, Addison-Wesley Publishing Company, Reading, MA, 1964.
- [162] F. Filisko, "Electrorheological materials," *Encyclopedia of Smart Materials*, M. Schwartz, Ed., John Wiley and Sons, New York, pp. 376–391, 2002.
- [163] C.A.J. Fletcher, Computational Galerkin Methods, Springer-Verlag, New York, 1984.
- [164] W. Flügge, Stresses in Shells, Second Edition, Springer-Verlag, New York, 1973.

- [165] J. Fousek and V. Janoušek, "The contribution of domain-wall oscillations to the small-signal permittivity of triglycine sulphate," *Physica Status Solidi*, 13, pp. 195–206, 1966.
- [166] A. Fröhlich, A. Brückner-Foit and S. Weyer, "Effective properties of piezoelectric polycrystals," Smart Structures and Materials 2000, Proceedings of the SPIE, Volume 3992, pp. 279–287, 2000.
- [167] S. Fu, Y. Huo and I. Müller, "Thermodynamics of pseudoelasticiy an analytic approach," Acta Mechanica, 99, pp. 1-19, 1993.
- [168] M. Fujimoto, The Physics of Structural Phase Transformations, Springer-Verlag, New York, 1997.
- [169] E. Fukada, "Piezoelectricity of bone and osteogenesis of piezoelectric films," *Mechanisms of Growth Control*, R.O. Becker, Ed., C.C. Thomas, Springfield, IL, 1981.
- [170] E. Fukada, "Piezoelectricity and pyroelectricity of biopolymers," *Ferroelectric Polymers: Chemistry, Physics, and Applications*, H.S. Nalwa, Ed., Marcell Dekker, Inc., New York, 1995.
- [171] H. Funakubo, Ed., Shape Memory Alloys, Translated from the Japanese by J.B. Kennedy, Gordon and Breach Science Publishers, New York, 1984.
- [172] W.S. Galinaitis, D.S. Joseph and R.C. Rogers, "Parameter identification for Preisach operators with singular measures," *Physica B*, 306, pp. 149–154, 2001.
- [173] W.S. Galinaitis and R.C. Rogers, "Compensation for hysteresis using bivariate Preisach models," Smart Structures and Materials 1997, Proceedings of the SPIE, Volume 3039, pp. 538–547, 1997.
- [174] W.S. Galinaitis and R.C. Rogers, "Control of a hysteretic actuator using inverse hysteresis compensation," Smart Structures and Materials 1998, Proceedings of the SPIE, Volume 3323, pp. 267–277, 1998.
- [175] K. Gall, H. Schitoglu, R. Anderson, I. Karaman, Y.I. Chumlyakov and I.V. Kireeva, "On the mechanical behavior of single crystal NiTi shape memory alloys and related polycrystalline phenomenon," *Materials Science and Engineering A*, A317, pp. 85–92, 2001.
- [176] D.R. Gamota and F.E. Filisko, "Dynamic mechanical studies of electrorheological materials: Moderate frequencies," *Journal of Rheology*, 35(3), pp. 399– 426, 1991.
- [177] M.V. Gandhi and B.S. Thompson, Smart Materials and Structures, Chapman and Hall, London, 1992.

- [178] X. Gao, M. Huang and L.C. Brinson, "A multivariant micromechanical model for SMAs, Part 1: crystallographic issues for single crystal model," *International Journal of Plasticity*, 16, pp. 1345-1369, 2000.
- [179] P. Ge and M. Jouaneh, "Modeling hysteresis in piezoceramic actuators," Precision Engineering, 17, pp. 211–221, 1995.
- [180] P. Ge and M. Jouaneh, "Tracking control of a piezoceramic actuator," *IEEE Transactions on Control Systems Technology*, 4(3), pp. 209–216, 1996.
- [181] P. deGennes, K. Okumura, M. Shahinpoor and K. Kim, "Mechanoelectric effects in ionic gels," *Europhysics Letters*, 50(4), pp. 513–518, 2000.
- [182] F. Gilletta, P. Lauginie et L. Taurel, "Relaxation diéectrique dans les cristaux de sulfate de glycocolle multidomaines," *Comptes Rendus Hebdomadaires des Séances de L'Académie des Sciences, Série B*, 270, pp. 94–96, 1970.
- [183] J.M. Ginder, M.E. Nichols, L.D. Elie and S.M. Clark, "Controllable-stiffness components based on magnetorheological elastomers," Smart Structures and Materials 2000, Proceedings of the SPIE, Volume 3985, pp. 418–425, 2000.
- [184] V.L. Ginzburg, Zhurnal Eksperimental'noĭ i Teoreticheskoĭ Fiziki (JETP), 15, p. 739, 1945.
- [185] K.R.C. Gisser, M.J. Geselbracht, A. Cappellari, L. Hunsberger, A.B. Ellis, J. Perepezko and G.C. Lisensky, "Nickel-titanium memory metal," *Journal of Chemical Education*, 71(4), pp. 334–340, 1994.
- [186] A.E. Glazounov, A.J. Bell and A.K. Tagantsev, "Relaxors as superparaelectrics with distributions of the local transition temperature," *Journal of Physics: Condensed Matter*, 7(21), pp. 4145–4168, 1995.
- [187] J. Gonzalo, Effective Field Approaches to Phase Transitions and Some Applications to Ferroelectrics, World Scientific, Singapore, 1991.
- [188] B.C. Goo and C. Lexcellent, "Micromechanics-based modeling of two-way memory effect of a single crystalline shape-memory alloy," Acta Materialia, 45(2), pp. 727–737, 1997.
- [189] J.B. Goodenough, "Summary of losses in magnetic materials," IEEE Transactions on Magnetics, 38(5), pp. 3398–3408, 2002.
- [190] R.B. Gorbet, D.W.L. Wang and K.A. Morris, "Preisach model identification of a two-wire SMA actuator," *IEEE International Conference on Robotics and Automation*, pp. 2161–2167, 1998.
- [191] W. Gorsky, "Röntgenugraphische untersuchung von umwandlungen in der legierung CuAu," Zeitschrift für Physik, 50, pp. 64–81, 1928.
- [192] P.L. Gould, Finite Element Analysis of Shells of Revolution, Pitman Advanced Publishing Program, Boston, 1985.

- [193] S. Govindjee and G.J. Hall, "A computational model for shape memory alloys," *International Journal of Solids and Structures*, 37, pp. 735–760, 2000.
- [194] E.J. Graesser and F.A. Cozzarelli, "Shape memory alloys as new materials for aseismic isolation," *Journal of Engineering Mechanics*, 117(11), pp. 2590– 2608, 1991.
- [195] A.J. Grodzinsky and J.R. Melcher, "Electromechanical transduction with charged polyelectrolyte membranes," *IEEE Transactions on Biomedical En*gineering, 23, pp. 421–433, 1976.
- [196] C.W. Groetsch, The Theory of Tikhonov Regularization for Fredholm Equations of the First Kind, Pitman, Boston, 1984.
- [197] Y. Gu, R.L. Clark, C.R. Fuller and A.C. Zander, "Experiments on active control of plate vibrations using piezoelectric actuators and polyvinylidene fluoride modal sensors," ASME Journal of Vibration and Acoustics, 116, pp. 303– 308, 1994.
- [198] D. ter Haar, Elements of Statistical Mechanics, 3rd Edition, Butterworth-Heinemann, Oxford, 1995.
- [199] C.W. Haas and W.F. Jaep, "Domain wall model for ferroelastics," *Physics Letters A*, 49A(1), pp. 77–78, 1974.
- [200] G.H. Haertling, "RAINBOW ceramics a new type of ultra-high-displacement actuator," American Ceramic Society Bulletin, 73, pp. 93–96, 1994.
- [201] G.H. Haertling, "Chemically reduced PLZT ceramics for ultra-high-displacement actuators, *Ferroelectrics*, 154, pp. 101–106, 1994.
- [202] D. Halim and S.O.R. Moheimani, "An optimization approach to optimal placement of collocated piezoelectric actuators and sensors on a thin plate," *Mechatronics*, 13, pp. 27–47, 2003.
- [203] C.A. Hall and T.A. Porsching, Numerical Analysis of Partial Differential Equations, Prentice Hall, Englewood Cliffs, NJ, 1990.
- [204] W.R. Hamilton, "On a general method in dynamics; By which the study of the motions of all free systems of attracting or repelling points is reduced to the search and differentiation of one central relation or characteristic function," *Philosophical Transactions of the Royal Society of London*, 124, pp. 247–308, 1834.
- [205] P.C. Hammer, O.P. Marlowe and A.H. Stroud, "Numerical integration over simplexes and cones," *Mathematical Tables and other Aids to Computation*, 10(55), pp. 130–137.
- [206] P.K. Hansma, V.B. Elings, O. Marti and C.E. Bracker, "Scanning tunneling microscopy and atomic force microscopy: Application to biology and technology," *Science*, 242, pp. 209–242, 1988.

- [207] T. Hao, "Electrorheological fluids," *Encyclopedia of Smart Materials*, M. Schwartz, Ed., John Wiley and Sons, New York, pp. 362–376, 2002.
- [208] A. Haraux, "Linear semigroups in Banach spaces," in Semigroups, Theory and Applications, II, H. Brezis et al., Eds., Pitman Research Notes in Mathematics, Volume 152, Longman, London, pp. 93–135, 1986.
- [209] J. Harrison and Z. Ounaies, "Piezoelectric polymers," *Encyclopedia of Smart Materials*, M. Schwartz, Ed., John Wiley and Sons, New York, pp. 860–873, 2002.
- [210] A.G. Hatch, R.C. Smith and T. De, "Model development and control design for high speed atomic force microscopy," Smart Structures and Materials 2004, Proceedings of the SPIE, Volume 5383, pp. 457–468, 2004.
- [211] M.J. Haun, E. Furman, S.J. Jang, H.A. McKinstry and L.E. Cross, "Thermodynamic theory of PbTiO<sub>3</sub>," *Journal of Applied Physics*, 62(8), pp. 3331– 3338, 1987.
- [212] D. Hebda and S.R. White, "Effect of training conditions and extended thermal cycling on nitinol two-way shape memory behavior," *Smart Materials and Structures*, 4, pp. 298–304, 1995.
- [213] C.E. Hecht, Statistical Thermodynamics and Kinetic Theory, Dover Publications, New York, 1998.
- [214] W. Heisenberg, "Zur theorie des ferromagnetismus," Zeitschrift für Physik, 49, pp. 619–636, 1928.
- [215] K.O. Hill and G. Meltz, "Fiber Bragg grating technology fundamentals and overview," *Journal of Lightwave Technology*, 15(8), pp. 1263–1276.
- [216] A.D. Hilton, D.J. Barber, C.A. Randall and T.R. Shrout, "On short range ordering in the perovskite lead magnesium niobate," *Journal of Materials Science*, 25, pp. 3461–3466, 1990.
- [217] P.D. Hislop and I.M Sigal, Introduction to Spectral Theory with Applications to Schrödinger Operators, Springer-Verlag, New York 1996.
- [218] C.L. Hom, "Simulating electrostrictive deformable mirrors: II. Nonlinear dynamic analysis," Smart Materials and Structures 8, pp. 700–708, 1999.
- [219] C.L. Hom, P.D. Dean and S.R. Winzer, "Simulating electrostrictive deformable mirrors: I. Nonlinear static analysis," *Smart Materials and Structures* 8, pp. 691–699, 1999.
- [220] C.L. Hom and N. Shankar, "A fully coupled constitutive model for electrostrictive ceramic materials," *Journal of Intelligent Material Systems and Structures*, 5, pp. 795–801, 1994.

- [221] C.L. Hom and N. Shankar, "Modeling nonlinearity in electrostrictive sonar transducers," *Journal of the Acoustical Society of America*, 104(4), pp. 1903– 1913, 1998.
- [222] C.L. Hom and N. Shankar, "A constitutive model for relaxor ferroelectrics," Smart Structures and Materials 1999, Proceedings of the SPIE, Volume 3667, pp. 134–144, 1999.
- [223] L. Hou and D.S. Grummon, "Transformational superelasticity in sputtered titanium-nickel thin films," *Scripta Metallurgica*, 33(6), pp. 989-995, 1995.
- [224] H.-C. Huang and A.S. Usmani, *Finite Element Analysis for Heat Transfer*, Springer–Verlag, Berlin, 1994.
- [225] M. Huang and L.C. Brinson, "A multivariant model for single crystal shape memory alloy behavior," *Journal of the Mechanics and Physics of Solids*, 46, pp. 1379–1409, 1998.
- [226] J.E. Huber, N.A. Fleck, C.M. Landis and R.M. McMeeking, "A constitutive model for ferroelectric polycrystals," *Journal of the Mechanics and Physics* of Solids, 47, pp. 1663–1697, 1999.
- [227] D. Hughes and J.T. Wen, "Preisach modeling of piezoceramic and shape memory alloy hysteresis," Smart Materials and Structures, 6, pp. 287–300, 1997.
- [228] F.V. Hunt, Electroacoustics: The Analysis of Transduction, and Its Historical Background, Published by the American Institute of Physics for the Acoustical Society of America, New York, 1982.
- [229] Y. Huo, "A mathematical model for the hysteresis in shape memory alloys," Continuum Mechanics and Thermodynamics, 1, pp. 283–303, 1989.
- [230] S.C. Hwang, C.S. Lynch and R.M. McMeeking, "Ferroelectric/ferroelastic interactions and a polarization switching model," *Acta Metallurgica et Materialia*, 43(5), pp. 2073–2084, 1995.
- [231] M.W. Hyer and A. Jilani, "Predicting the deformation characteristics of rectangular unsymmetrically laminated piezoelectric materials," *Smart Materials* and Structures, 7, pp. 1–8, 1998.
- [232] M.W. Hyer and A. Jilani, "Predicting the axisymmetric manufacturing deformations of disk-style benders," *Journal of Intelligent Material Systems and Structures*, 11, pp. 370–381, 2000.
- [233] M.W. Hyer and A. Jilani, "Deformation characteristics of circular RAINBOW actuators," Smart Materials and Structures, 11, pp. 175–195, 2002.
- [234] T. Ikeda, Fundamentals of Piezoelectricity, Oxford University Press, Oxford, UK, 1990.

- [235] D.J. Inman and S.H.S. Carneiro, "Smart structures, structural health monitoring and crack detection," in *Research Directions in Distributed Parameter Systems*, R.C. Smith and M.A. Demetriou, Eds., pp. 169–186, SIAM, Philadelphia, PA, 2003.
- [236] A. Ishida and V. Martynov, "Sputter-deposited shape-memory alloy thin films: Properties and applications," *MRS Bulletin*, 27(2), pp. 111–114, 2002.
- [237] E. Ising, "Beitrag zur theorie des ferromagnetismus," Zeitschrift für Physik, 31, pp. 253–258, 1925.
- [238] Y. Ivshin and T.J. Pence, "A thermomechanical model for a one variant shape memory material," *Journal of Intelligent Material Systems and Structures*, 5, pp. 455–473, 1994.
- [239] R.V. Iyer, "Recursive estimation of the Preisach density function for a smart actuator," Smart Structures and Materials 2004, Proceedings of the SPIE, Volume 5383, pp. 202–210, 2004.
- [240] R.V. Iyer and P.S. Krishnaprasad, "On a low-dimensional model for ferromagnetism," *Nonlinear Analysis: Theory, Methods and Application*, to appear.
- [241] R.V. Iyer and M.E. Shirley, "Hysteresis parameter identification with limited experimental data," *IEEE Transactions on Magnetics*, 40(5), pp. 3227–3239, 2004.
- [242] R.V. Iyer, X. Tan, P.S. Krishnaprasad, "Approximate inversion of a hysteresis operator with application to control of smart actuators," *IEEE Transactions* on Automatic Control, to appear.
- [243] B. Jaffe, W.R. Cook, Jr. and H. Jaffe, *Piezoelectric Ceramics*, Academic Press, New York, 1971.
- [244] R.D. James and M. Wuttig, "Magnetostriction of martensite," *Philosophical Magazine A*, 77(5), pp. 1273–1299, 1998.
- [245] H. Janocha, Ed., Adaptronics and Smart Structures, Springer-Verlag, Berlin, 1999.
- [246] H. Janocha and B. Clephas, "Hybrid actuator with piezoelectric and magnetostrictive material," Actuator 96, Proc. 5th International Conference on New Actuators, pp. 304–307, 1996.
- [247] D.C. Jiles, Introduction to Magnetism and Magnetic Materials, Chapman and Hall, New York, 1991.
- [248] D.C. Jiles, "A self-consistent generalized model for the calculation of minor loop excursions in the theory of hysteresis," *IEEE Transactions on Magnetics*, 28(5), pp. 2602–2604, 1992.

- [249] D.C. Jiles, "Theory of the magnetomechanical effect," Journal of Physics D: Applied Physics, 28, pp. 1537–1546, 1995.
- [250] D.C. Jiles and D.L. Atherton, "Theory of the magnetisation process in ferromagnetics and its application to the magnetomechanical effect," *Journal of Physics D: Applied Physics*, 17, pp. 1265–1281, 1984.
- [251] D.C. Jiles and D.L. Atherton, "Theory of ferromagnetic hysteresis," Magnetism and Magnetic Materials, 61, pp. 48–60, 1986.
- [252] D.C. Jiles and J.B. Thoelke, "Theoretical modelling of the effects of anisotropy and stress on the magnetization and magnetostriction of Tb<sub>0.3</sub>Dy<sub>0.7</sub>Fe<sub>2</sub>," *Journal of Magnetism and Magnetic Materials*, 134, pp. 143–160, 1994.
- [253] D.C. Jiles, J.B. Thoelke and M.K. Devine, "Numerical determination of hysteresis parameters for the modeling of magnetic properties using the theory of ferromagnetic hysteresis," *IEEE Transactions on Magnetics*, 28(1), pp. 27–35, 1992.
- [254] M.R. Jolly, J.W. Bender and J.D. Carlson, "Properties and applications of commercial magnetorheological fluids," Smart Structures and Materials 1998, Proceedings of the SPIE, pp. 262–275, 1998.
- [255] M.R. Jolly, J.D. Carlson and B.C. Munoz, "A model of the behavior of magnetorheological materials," *Smart Materials and Structures*, 5, pp. 607–614, 1996.
- [256] F. Jona and G. Shirane, *Ferroelectric Crystals*, Dover Publications, Inc., New York, 1993.
- [257] T. Kakeshita and K. Ullakko, "Giant magnetostriction in ferromagnetic shape-memory alloys," MRS Bulletin, 27(2), pp. 105–109, 2002.
- [258] G.M. Kamath and N.M. Wereley, "Nonlinear viscoelastic plastic model for electrorheological fluids," *Smart Materials and Structures*, 6(3), pp. 351–359, 1997.
- [259] M. Kamlah and Q. Jiang, "A constitutive model for ferroelectric PZT ceramics under uniaxial loading, *Smart Materials and Structures*, 8, pp. 441–459, 1999.
- [260] A. Katchalsky, "Rapid swelling and deswelling of reversible gels of polymeric acids by ionization," *Experientia*, 5, pp. 318–319, 1949.
- [261] H. Kawai, "The piezoelectricity of poly(vinylidene fluoride)," Japanese Journal of Applied Physics, 8, pp. 975–976, 1969.
- [262] A.D. Kersey, "A review of recent developments in fiber optic sensor technology," Optical Fiber Technology, 2, pp. 291–317, 1996.
- [263] C. Kittel, Introduction to Solid State Physics, Fifth Edition, John Wiley and Sons, New York, 1976.

- [264] U.F. Kocks, A.S. Argon and M.F. Ashby, *Thermodynamics and Kinetics of Slip*, Volume 19 in *Progress in Materials Science*, B. Chalmers, J.W. Christian and T.B. Massalsk, Eds., Pergamon Press, Oxford, 1975.
- [265] M. Kohl, D. Dittmann, E. Quandt and B. Winzek, "Thin film shape memory microvalves with adjustable operation temperature," *Sensors and Actuators* A: Physical, 83(1-3), pp. 214–219, 2000.
- [266] N.C. Koon, A.I. Schindler and F.L. Carter, "Giant magnetostriction in cubic rare earth-iron compounds of the type RFe<sub>2</sub>," *Physics Letters A*, 37, pp. 412– 414, 1971.
- [267] N.A. Koratkar and I. Chopra, "Testing and validation of a Froude scaled helicopter rotor model with piezo-bimorph actuated trailing edge flaps," Smart Structures and Materials 1997, Proceedings of the SPIE, Volume 3041, pp. 183–205, 1997.
- [268] M.A. Krasnosel'skiĭ and A.V. Pokrovskiĭ, Systems with Hysteresis, Nauka, Moscow, 1983; Translated by M. Niezgódka, Springer–Verlag, Berlin, 1989.
- [269] P. Krejčí and J. Sprekels, "On a system of nonlinear PDEs with temperaturedependent hysteresis in one-dimensional thermoplasticity," *Journal of Mathematical Analysis and Applications*, 209, pp. 25–46, 1997.
- [270] H. Kronmüller and M. Fähnle, Micromagnetism and the Microstructure of Ferromagnetic Solids, Cambridge University Press, Cambridge, UK, 2003.
- [271] P. Krulevitch, A.P. Lee, P.B. Ramsey, J.C. Trevino, J. Hamilton and M.A. Northrup, "Thin film shape memory alloy microactuators," *Journal* of *Microelectromechanical Systems*, 5(4), pp. 270–282, 1996.
- [272] A. Ktena, D.I. Fotiadis, P.D. Spanos and C.V. Massalas, "A Preisach model identification procedure and simulation of hysteresis in ferromagnets and shape-memory alloys, *Physica B: Condensed Matter*, 306(1–4), pp. 84–90, 2001.
- [273] J.N. Kudva, "Overview of the DARPA smart wing project," Journal of Intelligent Material Systems and Structures, 15(4), pp. 261–267, 2004.
- [274] J.N. Kudva, B. Sanders, J. Pinkerton-Florance and E. Garcia, "The DARPA/ AFRL/NASA Smart Wing Program — Final overview," Smart Structures and Materials 2002, Proceedings of the SPIE, Volume 4698, pp. 37–43, 2002.
- [275] W. Kuhn, B. Hargitay, A. Katchalsky and H. Eisenberg, "Reversible dilation and contraction by change the state of ionization of high-polyer acid networks," *Nature*, 165, pp. 514–516, 1950.
- [276] Y.W. Kwon and H. Bang, The Finite Element Method Using Matlab, CRSC Press, Boca Raton, FL, 1997.

- [277] J.E. Lagnese and J.-L. Lions, Modelling Analysis and Control of Thin Plates, Collection Recherches en Mathématiques Appliquées, Masson, Paris, 1989.
- [278] D.C. Lagoudas and A. Bhattacharyya, "On the correspondence between micromechanical models for isothermal pseudoelastic response of shape memory alloys and the Preisach model for hysteresis," *Mathematics and Mechanics of Solids*, 2(4), pp. 405–440, 1997.
- [279] D.C. Lagoudas and Z. Bo, "Thermomechanical modeling of polycrystalline SMAs under cyclic loading, Part II: material characterization and experimental results for a stable transformation cycle," *International Journal of Engineering Science*, 37, pp. 1141–1173, 1999.
- [280] B.D. Laikhtman, "Flexural vibrations of domain walls and dielectric dispersion of ferroelectrics," *Soviet Physics Solid State*, 15(1), pp. 62–68, 1973.
- [281] L.D. Landau, "Zur theorie der phasenumwandlungen I, II," Physikalische Zeitschrift der Sowjetunion, 11, p. 26 and p. 545, 1937; Zhurnal Éksperimental'noĭ i Teoreticheskoĭ Fiziki (JETP), 7, p. 19 and p. 627, 1937. English translation: "On the theory of phase transitions," pp. 193–216, Collected Papers of L.D. Landau, D. ter Haar, Ed., Published jointly by Gordan and Breach and Pergamon Press, New York, 1965.
- [282] L.D. Landau and E.M. Lifshitz, "On the theory of the dispersion of magnetic permeability in ferromagnetic bodies," *Physikalische Zeitschrift der Sowjetu*nion, 8, pp. 153–169, 1935.
- [283] L.D. Landau and E.M. Lifshitz, *Statistical Physics, Part 1*, 3rd Edition, Translated by J.B. Sykes and M.J. Kearsley, Butterworth and Heinemann, Oxford, UK, 1982.
- [284] L.D. Landau, E.M Lifshitz and L.P. Pitaevskii, *Electrodynamics of Continuous Media*, 2nd Edition, Translated by J.B. Sykes, J.S. Bell and M.J. Kearsley, Butterworth and Heinemann, Oxford, UK, 1982.
- [285] C.M. Landis, "Non-linear constitutive modeling of ferroelectrics," Current Opinion in Solid State and Materials Science, 8, pp. 59–69, 2004.
- [286] C.M. Landis, "On the strain saturation conditions for polycrystalline ferroelastic materials," *Journal of Applied Mechanics*, 70, pp. 470–478, 2003.
- [287] S. Lang, Real and Functional Analysis, Springer–Verlag, New York, 1993.
- [288] C.K. Lee and F.C. Moon, "Modal sensors/actuators," Journal of Applied Mechanics, 56, pp. 434–441, 1990.
- [289] E.W. Lee and J.E.L. Bishop, "Magnetic behavior of single-domain particles," Proceedings of the Physical Society, 89, pp. 661–675, 1966.

- [290] Y. Leino and J. Pitkäranta, "On the membrane locking of h-p finite elements in a cylindrical shell problem," *International Journal for Numerical Methods* in Engineering, 37, pp. 1053–1070, 1994.
- [291] A.W. Leissa, Vibration of Plates, NASA SP-160, 1969, Reprinted by the Acoustical Society of America through the American Institute of Physics, 1993.
- [292] A.W. Leissa, Vibration of Shells, NASA SP-288, 1973, Reprinted by the Acoustical Society of America through the American Institute of Physics, 1993.
- [293] A.P. Levanyuk, "Interaction between ferroelastic domain walls mediated by thermal fluctuations and defects," *Phase Transitions*, B55(1–4), pp. 127–133, 1995.
- [294] G. Li, E. Furman and G.H. Haertling, "Stress-enhanced displacements in PLZT rainbow actuators, *Journal of the American Ceramic Society*, 80, pp. 1382–1388, 1997.
- [295] X. Li, W.Y. Shih, I.A. Aksay and W.-H. Shih, "Electromechanical behavior of PZT-brass unimorphs," *Journal of the American Ceramic Society*, 82(7), pp. 1733–1740, 1999.
- [296] Y.L. Li, S.Y. Hu, Z.K. Liu and L.Q. Chen, "Phase-field model of domain structures in ferroelectric thin films," *Applied Physics Letters*, 78(24), pp. 3878– 3880, 2001.
- [297] C. Liang and C.A. Rogers, "One-dimensional thermomechanical constitutive relations for shape memory materials, *Journal of Intelligent Material Systems* and Structures, 1, pp. 207–234, 1990.
- [298] M.E. Lines and A.M Glass, Principles and Applications of Ferroelectrics and Related Materials, Oxford University Press, Oxford, UK, 1977, Oxford Classics Series, 2001.
- [299] F. Liorzou, B. Phelps and D.L. Atherton, "Macroscopic models of magnetization," *IEEE Transactions on Magnetics*, 36(2), pp. 418–428, 2000.
- [300] E.A. Little, "Dynamic behavior of domain walls in barium titanate," *Physical Review*, 98(4), pp. 978–984, 1955.
- [301] A.E.H. Love, A Treatise on the Mathematical Theory of Elasticity, Cambridge University Press, Fourth Edition, 1927.
- [302] W. Lu, A. Fadeev, B. Qi, E. Smela, B. Mattes, J. Ding, G. Spinks, J. Mazurkiewicz, D. Zhou, G. Wallace, D. MacFarlane, S. Forsyth and M. Forsyth, "Use of ionic liquids for Pi-conjugated polymer electrochemical devices," *Science*, 297, pp. 983–987, 2002.

- [303] W. Lu, D.-N. Fang and K-C. Hwang, "Nonlinear electric-mechanical behavior and micromechanics modelling of ferroelectric domain evolution," Acta Materialia, 47(10), pp. 2913–2926, 1999.
- [304] W. Lu and G.J. Weng, "A self-consistent model for the stress-strain behavior of shape-memory alloy polycrystals," *Acta Materialia*, 46, pp. 5423–5433, 1998.
- [305] J. Luan and F.C. Lee, "Design of a high frequency switching amplifier for smart material actuators with improved current mode control," PESC '98 Record, 29th Annual Power Electronics Specialists Conference, Volume 1, pp. 59–64, 1998.
- [306] A. Ludwig and E. Quandt, "Giant magnetostrictive thin films for applications in microelectromechanical systems," *Journal of Applied Physics*, 87(9), pp. 4691–4695, 2000.
- [307] D.G. Luenberger, Optimization by Vector Space Methods, John Wiley and Sons, New York, 1968.
- [308] H.V. Ly, R. Reitich, M.R. Jolly, H.T. Banks and K. Ito, "Simulations of particle dynamics in magnetorheological fluids," *Journal of Computational Physics*, 155, pp. 160–177, 1999.
- [309] C.S. Lynch, "The effect of uniaxial stress on the electro-mechanical response of 8/65/35 PLZT, Acta Materialia, 44(10), pp. 4137–4148, 1996.
- [310] C.C. Ma, R. Wang, et. al., "Frequency response of TiNi shape memory alloy thin film micro-actuators," Proceedings of the IEEE, Thirteenth Annual International Conference on Micro Electro Mechanical Systems, pp. 370–374, 2000.
- [311] J.H. Mabe, R.T. Ruggeri, E. Rosenzweig, C.-J. Yu, "Nitinol performance characterization and rotary actuator design," Smart Structures and Materials 2004, Proceedings of the SPIE, Volume 5388, pp. 95–109, 2004.
- [312] J.W. Macki, P. Nistri and P. Zecca, "Mathematical models for hysteresis," SIAM Review, 35, pp. 94–123, 1993.
- [313] J.A. Main and E. Garcia, "Design impact of piezoelectric actuator nonlinearities," *Journal of Guidance, Control, and Dynamics*, 20(2), pp. 327–332, 1997.
- [314] J.A. Main and E. Garcia, "Piezoelectric stack actuators and control system design: strategies and pitfalls," *Journal of Guidance, Control, and Dynamics*. 20(3), pp. 479–485, 1997.
- [315] J.A. Main, E. Garcia and D.V. Newton, "Precision position control of piezoelectric actuators using charge feedback," *Journal of Guidance, Control, and Dynamics.* 18(5), pp. 1068–73, 1995.

- [316] J.A. Main, D. Newton, L. Massengil and E. Garcia, "Efficient power amplifiers for piezoelectric applications," *Smart Materials and Structures*, 5(6), pp. 766– 775, 1996.
- [317] N. Makris, S.A. Burton, D. Hill and M. Jordan, "Analysis and design of ER damper for seismic protection of structures," ASCE Journal of Engineering Mechanics, 122(10), pp. 1003–1011, 1996.
- [318] S. Markuš, The Mechanics of Vibrations of Cylindrical Shells, Elsevier, New York, 1988.
- [319] J.E. Marsden and T.S. Ratiu, Introduction to Mechanics and Symmetry, Second Edition, Springer-Verlag, New York, 1999.
- [320] J.E. Martin and R.A. Anderson, "Electrostriction in field-structured composites: Basis for a fast artificial muscle?" *Journal of Chemical Physics*, 9(1), pp. 4278–4280, 1999.
- [321] J.E. Massad, Macroscopic Models for Shape Memory Alloy Characterization and Design, PhD Dissertation, North Carolina State University, Raleigh, NC, 2003.
- [322] J.E. Massad and R.C. Smith, "A domain wall model for hysteresis in ferroelastic materials," *Journal of Intelligent Material Systems and Structures*, 14(7), pp. 455–471, 2003.
- [323] J.E. Massad and R.C. Smith, "A homogenized free energy model for hysteresis in thin-film shape memory alloys," CRSC Technical Report CRSC-TR04-26; *International Journal on the Science and Technology of Condensed Matter Films*, to appear.
- [324] J.E. Massad, R.C. Smith and G.P. Carman, "A free energy model for thin-film shape memory alloys," Smart Structures and Materials 2003, Proceedings of the SPIE, Volume 5049, pp. 13–23, 2003.
- [325] W.P. Mason, Piezoelectric Crystals and Their Application to Ultrasonics, D. Van Nostrand Company, Inc., New York, 1950.
- [326] W.P. Mason, *Physical Acoustics and the Properties of Solids*, D. Van Nostrand Company, Inc., New York, 1958.
- [327] W.P. Mason, "Piezoelectricity, its history and applications," The Journal of the Acoustical Society of America, 70, pp. 1561–1566, 1981.
- [328] Y. Matsuzaki, K. Funami and H. Naito, "Inner loops of pseudoelastic hysteresis of shape memory alloys: Preisach approach," Smart Structures and Materials 2002, Proceedings of the SPIE, Volume 4699, pp. 355–364, 2002.

- [329] L.D. Mauck and C.S. Lynch, "Thermo-electro-mechanical behavior of ferroelectric materials. Part I: A computational micromechanical model versus experimental results," *Journal of Intelligent Material Systems and Structures*, 14, pp. 587–602, 2003.
- [330] L.D. Mauck and C.S. Lynch, "Thermo-electro-mechanical behavior of ferroelectric materials. Part II: Introduction of rate and self-heating effects," *Journal of Intelligent Material Systems and Structures*, 14, pp. 605–621, 2003.
- [331] G.A. Maugin, The Thermodynamics of Nonlinear Irreversible Behaviors, World Scientific Publishing Company, Singapore, 1999.
- [332] I.D. Mayergoyz, "Mathematical models of hysteresis," *Physical Review Letters*, 56(15), pp. 1518–1521, 1986.
- [333] I.D. Mayergoyz, "Mathematical models of hysteresis," *IEEE Transactions on Magnetics*, 22(5), pp. 603–608, 1986.
- [334] I.D. Mayergoyz, Mathematical Models of Hysteresis, Springer-Verlag, New York, 1991.
- [335] I.D. Mayergoyz, Nonlinear Diffusion of Electromagnetic Fields with Applications to Eddy Currents and Superconductivity, Academic Press, New York, 1998.
- [336] A.-M.R. McGowan, Ed., Smart Structures and Materials 2002: Industrial and Commercial Applications of Smart Structures Technologies, SPIE, Volume 4698, 2002.
- [337] B.Z. Mei, J.I. Schienbeim and B.A. Newman, "The ferroelectric behavior of odd-numbered nylons," *Ferroelectrics*, 144, pp. 51–60, 1993.
- [338] W.J. Merz, "Double hysteresis loop of BaTiO<sub>3</sub>", *Physical Review*, 91(3), pp. 513–517, 1953.
- [339] W.J. Merz, "Domain formation and domain wall motions in ferroelectric BaTiO<sub>3</sub> single crystals," *Physical Review*, 95(3), pp. 690–698, 1954.
- [340] J.E. Miesner and J.P. Teter, "Piezoelectric/magnetostrictive resonant inchworm motor," Proceedings of SPIE, Smart Structures and Materials, Volume 2190, pp. 520–527, 1994.
- [341] D.W. Miller, S.A. Collins and S.P. Peltzman, "Development of spatially convolving sensors for structural control applications," AIAA Paper 90-1127-CP, pp. 2283–2297, 1990.
- [342] R.C. Miller, "Some experiments on the motion of 180° domain walls in BaTiO<sub>3</sub>," *Physical Review*, 111(3), pp. 736–739, 1958.

- [343] R.C. Miller and A. Savage, "Motion of 180° domain walls in metal electroded barium titanate crystals as a function of electric field and sample thickness," *Journal of Applied Physics*, 31(4), pp. 662–669, 1960.
- [344] R.C. Miller and G. Weinreich, "Mechanism for the sideways motion of 180° domain walls in barium titanate," *Physical Review*, 117(6), pp. 1460–1466, 1960.
- [345] T. Mitsui, I. Tatsuzaki and E. Nakamura, An Introduction to the Physics of Ferroelectrics, Gordon and Breach Science Publishers, New York, 1976.
- [346] M. Mohebi, N. Jamasbi and J. Liu, "Simulation of the formation of nonequilibrium structures in magnetorheological fluids subject to an external magnetic field," *Physical Review*, 54, pp. 5407–5413, 1996.
- [347] W.W. Morey, G. Meltz and J.M. Weiss, "Recent advances in fiber grating sensors for utility industry applications," Self Calibrated Intelligent Optical Sensors and Systems, Proceedings of the SPIE, Volume 2594, pp. 90–98, 1995.
- [348] K.M. Mossi, R.P. Bishop, R.C. Smith and H.T. Banks, "Evaluation criteria for THUNDER actuators," Smart Structures and Materials 1999, Proceedings of the SPIE, Volume 3667, pp. 738–743, 1999.
- [349] K. Mossi, Z. Ounaies, R. Smith and B. Ball, "Prestressed curved actuators: Characterization and modeling of their piezoelectric behavior," Smart Structures and Materials 2003, Proceedings of the SPIE, Volume 5053, pp. 423–435, 2003.
- [350] K.M. Mossi, G.V. Selby and R.G. Bryant, "Thin-layer composite unimorph ferroelectric driver and sensor properties," *Materials Letters*, 35, pp. 39–49, 1998.
- [351] A.J. Moulson and J.M. Herbert, *Electroceramics: Materials, Properties, Applications*, Chapman and Hall, New York, 1990.
- [352] V. Mueller, A. Fuith, J. Fousek, H. Warhanek and H. Beige, "Spontaneous strain in ferroelastic incommensurate [N(CH<sub>3</sub>)<sub>4</sub>]<sub>2</sub>CuCl<sub>4</sub> crystals," *Solid State Communications*, 104(8), pp. 455–458, 1997.
- [353] I. Müller and K. Wilmanski, "A model for a pseudoelastic body," Il Nuovo Cimento della Societa Italiana di Fisica: B, 57, pp. 283–318, 1980.
- [354] K.A. Murphy, M.F. Gunther, A.M. Vengsarkar and R.O. Claus, "Fabry-Perot fiber-optic sensors in full-scale fatigue testing on an F-15 aircraft," *Applied Optics*, 31(4), pp. 431–433, 1992.
- [355] S. Nambu and D.A. Sagala, "Domain formation and elastic long-range interactions in ferroelectric perovskites," *Physical Review B*, 50(9), pp. 5838–5849, 1994.

- [356] A.W. Naylor and G.R. Sell, Linear Operator Theory in Engineering and Science, Springer-Verlag, New York, 2000.
- [357] J.M. Nealis and R.C. Smith, "Nonlinear adaptive parameter estimation algorithms for hysteresis models of magnetostrictive actuators," Smart Structures and Materials 2002, Proceedings of the SPIE, Volume 4693, pp. 25–36, 2002.
- [358] J.M. Nealis and R.C. Smith, " $\mathcal{H}_{\infty}$  Control Design for a Magnetostrictive Transducer," Proceedings of the 42nd IEEE Conference on Decision and Control, pp. 1801–1806, 2003.
- [359] J.M. Nealis and R.C. Smith, "Model-Based Robust Control Design for Magnetostrictive Transducers Operating in Hysteretic and Nonlinear Regimes," CRSC Technical Report CRSC-TR03-25; *IEEE Transactions on Control Systems Technology*, submitted.
- [360] S. Nemat-Nasser, "Micromechanics of actuation of ionic polymer-metal composites," *Journal of Applied Physics*, 92(5), pp. 2899–2915, 2002.
- [361] K.M. Newbury and D.J. Leo, "Electromechanical modeling and characterization of ionic polymer benders," *Journal of Intelligent Material Systems and Structures*, 13, pp. 51–60, 2002.
- [362] R.E. Newnham, "Electroceramics," Reports on Progress in Physics, 52, pp. 123–156, 1989.
- [363] R.E. Newnham, "Molecular mechanisms in smart materials," Materials Research Society Bulletin, Volume XXII, No. 5, pp. 20–34, 1997.
- [364] V.V. Novozhilov, *Thin Shell Theory*, Second Augmented and Revised Edition, Translated from the Second Russian Edition by P.G. Lowe, Edited by J.R.M. Radok, P. Noordhoff Ltd., Groningen, The Netherlands, 1964.
- [365] J.F. Nye, Physical Properties of Crystals: Their Representation by Tensors and Matrices, Oxford Press, London, 1957.
- [366] K. Oguro, Y. Kawami and H. Takenaka, "Bending of an ion-conducting polymer film-electrode composite by an electric stimulus at low voltage," *Journal* of the Micromachine Society, 5, pp. 27–30, 1992.
- [367] R.C. O'Handley, S.J. Murray, M. Marioni, H. Nembach, and S.M. Allen, "Phenomenology of giant magnetic-field-induced strain in ferromagnetic shapememory materials," *Journal of Applied Physics*, 87(9), pp. 4712–4717, 2000.
- [368] A. Olander, Zeitschrift für Kristallographie, Kristallgeometrie, Kristallphysik, Kristallchemie, 83, pp. 145–148, 1932.
- [369] J. Ortín, "Preisach modeling of hysteresis for a pseudoelastic Cu-Zn-Al single crystal," Journal of Applied Physics, 71(3), pp. 1454–1461, 1992.

- [370] K. Otsuka and T. Kakeshita, "Science and technology of shape-memory alloys: New developments," MRS Bulletin, 27(2), pp. 91–100, 2002.
- [371] Z. Ounaies, J.A. Young and J.S. Harrison, "An overview of the piezoelectric phenomenon in amorphous polymers," in *Field Responsive Polymers: Elec*troresponsive, Photoresponsive, and Responsive Polymers in Chemistry and Biology, I.M. Khan and J.S. Harrison, Eds., pp. 88–103, ACS Symposium Series 726, American Ceramical Society, Washington, DC 1999.
- [372] J.A. Palmer, B. Dessent, J.F. Mulling, T. Usher, E. Grant, J.W. Eischen, A.I. Kingon, "The design and characterization of a novel piezoelectric transducer-based linear motor," *IEEE/ASME Transactions on Mechatronics*, 9(2), pp. 392–398, 2004.
- [373] Q. Pan and R.D. James, "Micromagnetic study of Ni<sub>2</sub>MnGa under applied field," *Journal of Applied Physics*, 87(9), pp. 4702–4706, 2000.
- [374] N. Papenfuß and S. Seelecke, "Simulation and control of SMA actuators," Smart Structures and Materials 1999, Proceedings of the SPIE, Volume 3667, pp. 586–595, 1999.
- [375] M. Parthasarathy and D.J. Klingenberg, "Electrorheology: mechanisms and models," *Material Science and Engineering*, R17, pp. 57–103, 1996.
- [376] R.K. Pathria, *Statistical Mechanics*, Pergamon Press, Oxford, 1972.
- [377] E. Patoor and M. Berveiller, "Micromechanical modeling of the thermodynamic behavior of shape memory alloys," *Mechanics of Solids with Phase Changes*, M. Berveiller and F.D. Fischer, Eds., Springer, New York, pp. 121– 188, 1997.
- [378] B.F. Phelps, F. Liorzou and D.L. Atherton, "Inclusive model of ferromagnetic hysteresis," *IEEE Transactions on Magnetics*, 38(2), pp. 1326–1332, 2002.
- [379] S.M. Pilgrim, M. Massuda, J.D. Prodey, and A.P. Ritter, "Electrostrictive sonar drivers for flextensional transducers," *Transducers for Sonics and Ultrasonics*, M. McCollum, B.F. Hamonic, and O.B. Wilson, Eds., Lancaster PA, Technomic, 1993.
- [380] J. Pitkäranta, "The problem of membrane locking in finite element analysis of cylindrical shells," *Numerische Mathematik*, 61, pp. 523–542, 1992.
- [381] K.C. Pitman, "The influence of stress on ferromagnetic hysteresis," IEEE Transactions on Magnetics, 26(5), pp. 1978–1980, 1990.
- [382] F. Preisach, "Uber die magnetische nachwirkung," Zeitschrift fur Physik, 94, pp. 277–302, 1935.
- [383] P.M. Prenter, Splines and Variational Methods, John Wiley and Sons, New York, 1975.

- [384] G. Puglisi and L. Truskinovsky, "Mechanics of a discrete chain with bi-stable elements," *Journal of the Mechanics and Physics of Solids*, 48, pp. 1–27, 2000.
- [385] G. Puglisi and L. Truskinovsky, "Rate independent hysteresis in a bi-stable chain," *Journal of the Mechanics and Physics of Solids*, 50, pp. 165–187, 2002.
- [386] G. Puglisi and L. Truskinovsky, "A mechanism of transformational plasticity," Continuum Mechanics and Thermodynamics, 14(5), pp. 437–457, 2002.
- [387] J. Rabinow, "The magnetic fluid clutch," AIEE Transactions, 67, pp. 1308– 1315, 1948.
- [388] J.K. Raye and R.C. Smith, "A temperature-dependent model for relaxor ferroelectric compounds," Smart Structures and Materials 2004, Proceedings of the SPIE, Volume 5383, pp. 1–10, 2004.
- [389] B.D. Reddy, Introductory Functional Analysis, Springer-Verlag, New York, 1998.
- [390] J.N. Reddy, An Introduction to the Finite Element Method, McGraw-Hill Book Company, New York, 1984.
- [391] J.B. Restorff, "Magnetostrictive materials and devices," *Encyclopedia of Applied Physics*, Volume 9, pp. 229–244, 1994.
- [392] J.B. Restorff, H.T. Savage, A.E. Clark and M. Wun-Fogle, "Preisach modeling of hysteresis in Terfenol-D," *Journal of Applied Physics*, 67(9), pp. 5016–5018, 1996.
- [393] W.P. Robbins and D.E. Glumac, "A planar unimorph-based actuator with large vertical displacement capability. Part II: theory," *IEEE Transactions* on Ultrasonics, Ferroelectrics and Frequency Control, 45(5), pp. 1151–1159, 1998.
- [394] G. Robert, D. Damjanovic and N. Setter, "Preisach modeling of piezoelectric nonlinearity in ferroelectric ceramics," *Journal of Applied Physics*, 89(9), pp. 5067–5074, 2001.
- [395] J. Rödel and W.S. Kreher, "Modeling of domain wall contributions to the effective properties of polycrystalline ferroelectric ceramics," Smart Structures and Materials 2000, Proceedings of the SPIE, Volume 3992, pp. 353–362, 2000.
- [396] N.N. Rogacheva, The Theory of Piezoelectric Shells and Plates, CRC Press, Boca Raton, FL, 1994.
- [397] A.L. Roytburd, "Elastic domains and polydomain phases in solids," Phase Transitions, B45(1), pp. 1–34, 1993.
- [398] D. Rugar, O. Züger, S.T. Hoen, C.S. Yannoni, H.-M. Vieth and R.D. Kendrick, "Force detection of nuclear magnetic resonance," *Science*, 264, pp. 1560–1563, 1994.

- [399] K. Sadeghipour, R. Salomon and S. Neogi, "Development of a novel electrochemically active membrane and smart material based vibration sensor/damper," *Smart Materials and Structures*, 1(2), pp. 172–179, 1992.
- [400] M.V. Salapaka, H.S. Bergh, J. Lai, A. Majumdar and E. McFarland, "Multimode noise analysis of cantilevers for scanning probe microscopy," *Journal of Applied Physics*, 81(6), pp. 2480–2487, 1997.
- [401] S. Salapaka, A. Sebastian, J.P. Cleveland and M.V. Salapaka, "High bandwidth nano-positioner: A robust control approach," *Review of Scientific In*struments, 73(9), pp. 3232–3241, 2002.
- [402] E.K.H. Salje, Phase Transitions in Ferroelastic and Co-elastic Crystals, Cambridge University Press, Cambridge, UK, 1990; Student Edition, 1993.
- [403] L. Sandlund, M. Fahlander, T. Cedell, A.E. Clark, J.B. Restorff and M. Wun-Fogle, "Magnetostriction, elastic moduli, and coupling factors of composite Terfenol-D," *Journal of Applied Physics*, 75(10), pp. 5656–5658, 1994.
- [404] R.L. Sarno and M.E. Franke, "Suppression of flow induced pressure oscillations in cavities," *Journal of Aircraft*, 31(1), pp. 90–96, 1994.
- [405] G. Schitter, P. Menold, H.F. Knapp, F. Allgower and A. Stemmer, "High performance feedback for fast scanning atomic force microscopes," *Review of Scientific Instruments*, 72(8), pp. 3320–3327, 2001.
- [406] L. Schumaker, Spline Functions: Basic Theory, John Wiley and Sons, New York, 1981.
- [407] J. Schweiger, "Aircraft control applications of smart structures," *Encyclope*dia of Smart Materials, M. Schwartz, Ed., John Wiley and Sons, New York, pp. 42–59, 2002.
- [408] A. Sebastion and S. Salapaka, " $H_{\infty}$  loop shaping design for nano-positioning," Proceedings of the American Control Conference, pp. 3708–3713, 2003.
- [409] S. Seelecke, "Modeling the dynamic behavior of shape memory alloys," International Journal of Non-Linear Mechanics, 37, pp. 1363–1374, 2002.
- [410] S. Seelecke, "A fully coupled thermomechanical model for shape memory alloys, Part I: theory," *Journal of the Mechanics and Physics of Solids*, submitted.
- [411] S. Seelecke and O. Heintze, "A model for the strain-rate dependent inner loop behavior of NiTi," Preprint.
- [412] S. Seelecke and O. Kastner, "A fully coupled thermomechanical model for shape memory alloys, Part II: numerical simulation," *Journal of the Mechanics and Physics of Solids*, submitted.

- [413] S. Seelecke and I. Müller, "Shape memory alloy actuators in smart structures — Modeling and simulation," ASME Applied Mechanics Reviews, 57(1), pp. 23–46, 2004.
- [414] D. Segalman, W. Witkowski, D. Adolf and M. Shahinpoor, "Theory of electrically controlled polymeric muscles as active materials in adaptive structures," *Smart Materials and Structures*, 1(1), pp. 95–100, 1992.
- [415] T.I. Seidman and C.R. Vogel, "Well posedness and convergence of some regularisation methods for non-linear ill posed problems," *Inverse Problems*, 5, pp. 227-238, 1989.
- [416] N. Setter and L.E. Cross, Journal of Applied Physics, "The role of Bsite cation disorder in diffuse phase transition behavior of perovskite ferroelectrics," 51(8), pp. 4356–4360, 1980.
- [417] A. Shadowitz, The Electromagnetic Field, Dover Publications, New York, 1975.
- [418] M. Shahinpoor, "Conceptual design, kinematics and dynamics of swimming robotic structures using ionic polymeric gel muscles," *Smart Materials and Structures*, 1(1), pp. 91–94, 1992.
- [419] M. Shahinpoor, "Continuum electromechanics of ionic polymeric gels as artificial muscles for robotic applications," *Smart Materials and Structures*, 3, pp. 367–372, 1994.
- [420] M. Shahinpoor, "Micro-electro-mechanics of ionic polymeric gels as electrically controllable artificial muscles," *Journal of Intelligent Material Systems* and Structures, 6(3), pp. 307–314, 1995.
- [421] M. Shahinpoor, Y. Bar-Cohen, J. Simpson and J. Smith, "Ionic polymer-metal composites (IPMCs) as biomimetic sensors, actuators and artificial muscles — a review," *Smart Materials and Structures*, 7, pp. R15–R30, 1998.
- [422] I.H. Shames and C.L. Dym, Energy and Finite Element Methods in Structural Mechanics, Taylor and Francis, New York, 1991.
- [423] N. Shankar and C.L. Hom, "An acoustic/thermal model for self-heating in PMN sonar projectors," *Journal of the Acoustical Society of America*, 108, pp. 2151–2158, 2000.
- [424] J.A. Shaw, B.-C. Chang, M.A. Iadicola and Y.M. Leroy," "Thermodynamics of a 1-D shape memory alloy: modeling, experiments, and application," Smart Structures and Materials 2003, Proceedings of the SPIE, Volume 5049, pp. 76– 87, 2003.
- [425] J.A. Shaw and S. Kyriakides, "Thermomechanical aspects of NiTi," Journal of the Mechanics and Physics of Solids, 43(1), pp. 1243–1281, 1995.

- [426] D.D. Shin and G.P. Carman, "Operating frequency of thin film NiTi in fluid media," Proceedings of the 2001 ASME IMECE, MEMS Symposium, pp. 221– 227, 2001.
- [427] M.E. Shirley and R. Venkataraman, "On the identification of Preisach measures," Smart Structures and Materials 2003, Proceedings of the SPIE, Volume 5049, pp. 326–336, 2003.
- [428] T.M. Simon, F. Reitich, M.R. Jolly, K. Ito and H.T. Banks, "Estimation of the effective permeability in magnetorheological fluids," *Journal of Intelligent Material Systems and Structures*, 10, pp. 872–879, 1999.
- [429] T.M. Simon, F. Reitich, M.R. Jolly, K. Ito and H.T. Banks, "On the effective magnetic properties of magnetorheological fluids," *Mathematical and Computer Modeling*, 33, pp. 273–284, 2001.
- [430] R.C. Smith, "A Galerkin method for linear PDE systems in circular geometries with structural acoustic applications," SIAM Journal on Scientific Computing, 18(2), pp. 371–402, 1997.
- [431] R.C. Smith, "Inverse compensation for hysteresis in magnetostrictive transducers," *Mathematical and Computer Modelling*, 33, pp. 285–298, 2001.
- [432] R.C. Smith, C. Bouton and R. Zrostlik, "Partial and full inverse compensation for hysteresis in smart material systems," Proceedings of the 2000 American Control Conference, pp 2750–2754, 2000.
- [433] R.C. Smith and M.J. Dapino, "A homogenized energy theory for ferromagnetic hysteresis," *IEEE Transactions on Magnetics*, submitted.
- [434] R.C. Smith, M.J. Dapino and S. Seelecke, "A free energy model for hysteresis in magnetostrictive transducers," *Journal of Applied Physics*, 93(1), pp. 458– 466, 2003.
- [435] R.C. Smith and A. Hatch, "Parameter estimation techniques for nonlinear hysteresis models," Smart Structures and Materials 2004, Proceedings of the SPIE, Volume 5383, pp. 155–163, 2004.
- [436] R.C. Smith, A. Hatch and T. De, "Model development for piezoceramic nanopositioners," Proceedings of the 42nd IEEE Conference on Decision and Control, pp. 2638–2643, 2003.
- [437] R.C. Smith, A. Hatch, B. Mukherjee and S. Liu, "A homogenized energy model for hysteresis in ferroelectric materials: General density formulation," CRSC Technical Report CRSC-TR04-23; Journal of Intelligent Material Systems and Structures, to appear.
- [438] R.C. Smith and C.L. Hom, "Domain wall theory for ferroelectric hysteresis," Journal of Intelligent Material Systems and Structures, 10(3), pp. 195–213, 1999.

- [439] R.C. Smith and C.L. Hom, "A temperature-dependent hysteresis model for relaxor ferroelectrics," Smart Structures and Materials 2000, Proceedings of the SPIE, Volume 3992, pp. 267–278, 2000.
- [440] R.C. Smith and H.L. Hom, "A temperature-dependent constitutive model for relaxor ferroelectrics," CRSC Technical Report CRSC-TR00-26; Journal of Intelligent Material Systems and Structures, to appear.
- [441] R.C. Smith and J.E. Massad, "A unified methodology for modeling hysteresis in ferroic materials," Proceedings of the 2001 ASME Design Engineering Technical Conferences and Computers and Information in Engineering Conference, Vol 6, Pt B, pp. 1389–1398, 2001.
- [442] R.C. Smith and Z. Ounaies, "A domain wall model for hysteresis in piezoelectric materials," *Journal of Intelligent Material Systems and Structures*, 11(1), pp. 62–79, 2000.
- [443] R.C. Smith and Z. Ounaies, "Model development for high performance piezoelectric polymers," Material Research Society Symposium Proceedings Volume 698, pp. 217–222, 2002.
- [444] R.C. Smith, Z. Ounaies and R. Wieman, "A model for rate-dependent hysteresis in piezoceramic materials operating at low frequencies," Smart Structures and Materials 2000, Proceedings of the SPIE, Volume 3992, pp. 128–136, 2000.
- [445] R.C. Smith and M. Salapaka, "Model development for the positioning mechanisms in an atomic force microscope," in *Control and Estimation of Distributed Parameter Systems*, W. Desch, F. Kappel and K. Kunisch, Eds., *International Series of Numerical Mathematics*, Volume 143, pp. 249–269, 2002.
- [446] R.C. Smith, M.V. Salapaka, A. Hatch, J. Smith and T. De, "Model development and inverse compensator design for high speed nanopositioning," Proceedings of the 41st IEEE Conference on Decision and Control, pp. 3652–3657, 2002.
- [447] R.C. Smith and S. Seelecke, "An energy formulation for Preisach models," Smart Structures and Materials 2002, Proceedings of the SPIE, Volume 4693, pp. 173–182, 2002.
- [448] R.C. Smith, S. Seelecke, M.J. Dapino and Z. Ounaies, "A unified model for hysteresis in ferroic materials," Smart Structures and Materials 2003, Proceedings of the SPIE, Volume 5049, pp. 88–99, 2003.
- [449] R.C. Smith, S. Seelecke, M.J. Dapino and Z. Ounaies, "A unified framework for modeling hysteresis in ferroic materials," CRSC Technical Report CRSC-TR04-35; Journal of the Mechanics and Physics of Solids, submitted.

- [450] R.C. Smith, S. Seelecke, Z. Ounaies and J. Smith, "A free energy model for hysteresis in ferroelectric materials," *Journal of Intelligent Material Systems* and Structures, 14(11), pp. 719–739, 2003.
- [451] R.C. Smith and R. Zrostlik, "Inverse compensation for ferromagnetic hysteresis," Proceedings of the 38th IEEE Conference on Decision and Control, pp. 2875–2880, 1999.
- [452] G.S. Smolensky, "Physical phenomena in ferroelectrics with diffused phase transition," Journal of the Physical Society of Japan (Suppl.), 28, pp. 26–37, 1970.
- [453] W. Soedel, Vibrations of Shells and Plates, Second Edition, Marcel Dekker, Inc., New York, 1993.
- [454] A.N. Soukhojak and Y.-M. Chiang, "Generalized rheology of active materials," *Journal of Applied Physics*, 88(11), pp. 6902–6909, 2000.
- [455] A. Sozinov, A.A. Likhachev, N. Lanska and K. Ullakko, "Giant magnetic-field induced strain in NiMnGa seven-layered martensite phase," *Applied Physics Letters*, 80, pp. 1746–1749, 2002.
- [456] B.F. Spencer, Jr., S.J. Dyke, M.K. Sain and J.W. Carlson, "Phenomenological model for magnetorheological dampers," ASCE Journal of Engineering Mechanics, 123(3), pp. 230–238, 1997.
- [457] P.N. Sreeran, G. Salvady and N.G. Naganathan, "Hysteresis prediction for a piezoceramic material system," Proceedings of the 1993 ASME Winter Annual Meeting, New Orleans, LA, Volume AD-VOL 35, pp. 35–42, 1993.
- [458] A.V. Srinivasan and D.M. McFarland, Smart Structures: Analysis and Design, Cambridge University Press, Cambridge, UK, 2001.
- [459] R. Stalmans, J. Van Humbeeck and L. Delaey, "The two way memory effect in copper-based shape memory alloys — thermodynamics and mechanisms," *Acta Metallurgica et Materialia*, 40(11), pp. 2921–2931, 1992.
- [460] A. Stancu and L. Spinu, "Temperature- and time-dependent Preisach model for a Stoner–Wohlfarth particle system," *IEEE Transactions on Magnetics*, 34(6), pp. 3876–3875, 1998.
- [461] H.E. Stanley, Introduction to Phase Transitions and Critical Phenomena, Oxford University Press, Oxford, 1971.
- [462] F.L. Stasa, Applied Finite Element Analysis for Engineers, Holt, Rinehart and Winston, New York, 1985.
- [463] C.G.F. Stenger, F.L. Scholten and A.J. Burggraaf, "Ordering and diffuse phase transitions in Pb(Sc<sub>0.5</sub>Ta<sub>0.5</sub>)O<sub>3</sub> ceramics," *Solid State Communications*, 32, pp. 989–992, 1979.

- [464] E.C. Stoner and E.P. Wohlfarth, "A mechanism of magnetic hysteresis in heterogeneous alloys," *Philosophical Transactions of the Royal Society of London*, 240A, pp. 599–642, 1948.
- [465] G. Strang, *Linear Algebra and Its Applications*, 3rd Edition, Harcourt, Brace and Company, Orlando, FL, 1988.
- [466] S. Strässler and C. Kittel, "Degeneracy and the order of the phase transformation in the molecular-field approximation," *Physical Review*, 139(3A), pp. A758–A760, 1965.
- [467] J.K. Strelec, D.C. Lagoudas, M.A. Khan and J. Yen, "Design and implementation of a shape memory alloy actuated reconfigurable airfoil, *Journal of Intelligent Material Systems and Structures*, 14(4/5), pp. 257–273, 2003.
- [468] J. Su, J.S. Harrison and T. St. Clair, "Novel polymeric elastomers for actuation," ISAF 2000: Proceedings of the 2000 12th IEEE International Symposium on Applications of Ferroelectrics, Volume 2, p. 811–814, 2000.
- [469] S. Tadokoro, T. Takamori and K. Oguro, *Electroactive Polymer Actuators as Artificial Muscles*, Chapter 13, SPIE Press, Bellingham, WA, pp. 331–336, 2001.
- [470] B.K. Taleghani and J.F. Campbell, "Nonlinear finite element modeling of THUNDER piezoelectric actuators," NASA report NASA/TM-1999-209322, 1999.
- [471] X. Tan and J.S. Baras, "Modeling and control of hysteresis in magnetostrictive actuators," Automatica, 40(9), pp. 1469–1480, 2004.
- [472] X. Tan, R. Venkataraman and P.S. Krishnaprasad, "Control of hysteresis: Theory and experimental results," Smart Structures and Materials 2001, Proceedings of the SPIE, Volume 4326, pp. 101–112, 2001.
- [473] K. Tanaka, S. Kobayashi and Y. Sato, "Thermodynamics of transformation, pseudoelasticity and shape memory effect in alloys," *International Journal of Plasticity*, 2, pp. 59–72, 1986.
- [474] K. Tanaka and S. Nagaki, "A thermomechanical description of materials with internal variables in the process of phase transitions," *Ingenieur Archiv* (later *Archive of Applied Mechanics*), 51, pp. 287–299, 1982.
- [475] K. Tanaka, F. Nishimura and H. Tobushi, "Phenomenological analysis on subloops in shape memory alloys due to incomplete transformations," *Journal* of Intelligent Material Systems and Structures, 5(4), pp. 487–493, 1994.
- [476] J. Tani, T. Takagi and J. Qiu, "Intelligent material systems: Application of functional materials," *Applied Mechanics Reviews*, 51(8), pp. 505–521, 1998.
- [477] G. Tao and P.V. Kokotović, "Adaptive control of plants with unknown hysteresis," *IEEE Transactions on Automatic Control*, 40(2), pp. 200–212, 1995.

- [478] G. Tao and P.V. Kokotović, Adaptive Control of Systems with Actuator and Sensor Nonlinearities, John Wiley and Sons, New York, 1996.
- [479] V. Thomée, Galerkin Finite Element Methods for Parabolic Problems, Springer-Verlag, Berlin, 1997.
- [480] S. Timoshenko and S. Woinowsky-Krieger, *Theory of Plates and Shells*, Second Edition, McGraw-Hill Book Company, Inc., New York, 1987.
- [481] M. Tokuda, S. Sogino, T. Inaba and P. Sittner, "Two-way shape memory effect obtained by training of combined cyclic loading," in *IUTAM Symposium on Mechanics of Martensitic Phase Transformation in Solids*, Q.P. Sun, Ed., Kluwer Academic Publishers, Dordrecht, pp. 55–62, 2002.
- [482] J.-C. Tolédano and P. Tolédano, The Landau Theory of Phase Transitions: Application to Structural, Incommensurate, Magnetic and Liquid Crystal Systems, World Scientific Publishing, Singapore, 1987.
- [483] R.D. Turner, T. Valis, W.D. Hogg, and R.M. Measures, "Fiber-optic strain sensors for smart structures," *Journal of Intelligent Material Systems and Structures*, 1, 1990, pp. 26–49.
- [484] J.A. Tuszyński, B. Mróz, H. Kiefte and M.J. Clouter, "Comments on the hysteresis loop in ferroelastic LiCsSO<sub>4</sub>," *Ferroelectrics*, 77, pp. 111–120, 1988.
- [485] H.S. Tzou, Piezoelectric Shells: Distributed Sensing and Control of Continua, Kluwer Academic Publishers, Boston, 1993.
- [486] H.S. Tzou and M. Gadre, "Theoretical analysis of a multi-layered thin shell coupled with piezoelectric actuators for distributed vibration controls," *Journal of Sound and Vibration*, 132(3), pp. 433–450, 1989.
- [487] H.S. Tzou and R.V. Howard, "A piezothermoelastic thin shell theory applied to active structures," ASME Journal of Vibration and Acoustics, 116(3), pp. 295–302, 1994.
- [488] H.S. Tzou and C.I. Tseng, "Distributed piezoelectric sensor/actuator design for dynamic measurement/control of distributed parameter systems: A piezoelectric finite element approach," *Journal of Sound and Vibration*, 138(1), pp. 17–34, 1990.
- [489] K. Uchino, Piezoelectric Actuators and Ultrasonic Motors, Kluwer Academic Publishers, Boston, 1997.
- [490] E. Udd, "Fiber optic smart structures," Chapter 14 in Fiber Optic Sensors: An Introduction for Engineers and Scientists, E. Udd, Ed., pp. 439–467, John Wiley and Sons, New York, 1991.

- [491] T.D. Usher, A. Sim, G. Ashford, G. Camargo, A. Cabanyog and K. Ulibarri, Jr., "Modeling and applications of new piezoelectric actuator technologies," Smart Structures and Materials 2004, Proceedings of the SPIE, Volume 5383, pp. 31–38, 2004.
- [492] R. Valenzuela, Magnetic Ceramics, Cambridge University Press, Cambridge, UK, 1994.
- [493] J. Van Humbeeck and R. Stalmans, "Characteristics of shape memory alloys," in *Shape Memory Materials*, K. Otsuka and C.M. Wayman, Eds., Cambridge University Press, Cambridge, UK, pp. 149–183, 1998.
- [494] J. Van Humbeeck and R. Stalmans, "Shape memory alloys, types and functionalities," in *Encyclopedia of Smart Materials*, M. Schwartz, Ed., John Wiley and Sons, New York, pp. 951–964, 2002.
- [495] R. Venkataraman, "A hybrid actuator," MS Thesis, University of Maryland, College Park, MD, 1995.
- [496] R. Venkataraman and P.S. Krishnaprasad, "Qualitative analysis of a bulk ferromagnetic hysteresis model," Proceedings of the 37th IEEE Conference on Decision and Control, pp. 2443–2448, 1998.
- [497] D. Viehland, S.J. Jang and L.E. Cross, "Freezing of the polarization fluctuations in lead magnesium niobate relaxors," *Journal of Applied Physics*, 68(6), pp. 2916–2921, 1990.
- [498] D. Viehland, S.J. Jang, L.E. Cross, M. Wuttig, "Deviation from Curie–Weiss behavior in relaxor ferroelectrics," *Physical Review*, 46(13), pp. 8003–8006, 1992.
- [499] C.R. Vogel, Computational Methods for Inverse Problems, SIAM, Philadelphia, PA, 2002.
- [500] W. Voigt, Lehrbuch der Kristallphysik, B.G. Teubner, Leipzig, Berlin, 1928.
- [501] S.V. Vonsovskii, Magnetism: Volume Two, Translated from Russian by Ron Hardin, John Wiley and Sons, New York, 1974.
- [502] V.K. Wadhawan, Introduction to Ferroic Materials, Gordon and Breach Science Publishers, Amsterdam, 2000.
- [503] T.T. Wang, J.M. Herbert and A.M. Glass, Eds., The Applications of Ferroelectric Polymers, Blackie and Son, Ltd., Glasgow, 1988.
- [504] G. Webb, A. Kurdila and D.C. Lagoudas, "Adaptive hysteresis model for model reference control with actuator hysteresis," *Journal of Guidance, Control and Dynamics*, 23(3), pp. 459–465, 2000.
- [505] R. Weinstock, Calculus of Variations with Applications to Physics and Engineering, Dover, New York, 1974.

- [506] P. Weiss, "La variation du ferromagnétisme avec la temperature," Comptes Rendus Hebdomadaires des Séances de L'Académie des Sciences, (later Comptes Rendus de L'Académie des Sciences), 143, pp. 1136–1139, 1906.
- [507] P. Weiss, "L'hypothèse du champ moléculaire et de la propriété ferromagnétique," Journal de Physique Théorique et Appliquée, Series 4, Volume 6, pp. 661–690, 1907.
- [508] F.B. Weissler, "Semilinear evolution equations in Banach spaces," Journal of Functional Analysis, 32, 1979, pp. 277–296.
- [509] R. Wieman, R.C. Smith, T. Kackley, Z. Ounaies and J. Bernd, "Displacement models for THUNDER actuators having general loads and boundary conditions," Smart Structures and Materials 2001, Proceedings of the SPIE, Volume 4326, pp. 252–263, 2001.
- [510] K. Wilde, P. Gardoni and Y. Fujino, "Base isolation system with shape memory alloy device for elevated highway bridges," *Engineering Structures*, 22, pp. 222–229, 2000.
- [511] E.J. Williams, "The effect of thermal agitation on atomic arrangement in alloys III," *Proceedings of the Royal Society of London*, A152, pp. 231–252, 1935.
- [512] W. Williams and D.J. Dunlop, "Three-dimensional micromagnetic modelling of ferromagnetic domain structure," *Nature*, 337, pp. 634–637, 1989.
- [513] J.M. Wiltse and A. Glezer, "Manipulation of free shear flows using piezoelectric actuators," *Journal of Fluid Mechanics*, 249, pp. 261–285, 1993.
- [514] W.M. Winslow, "Method and means for translating electrical impulses into mechanical force," U.S. Patent 2,417,850, 1947.
- [515] W.M. Winslow, "Induced fibration of suspensions," Journal of Applied Physics, 20, pp. 1137–1140, 1949.
- [516] S.A. Wolf, D.D. Awschalom, R.A. Buhrman, J.M. Daughton, S. von Molnár, M.L. Chtchelkanova and D.M. Teger, "Spintronics: A spin-based electronics vision for the future," *Science*, 294, pp. 1488–1495, 2001.
- [517] J.L. Woolman, K.P. Mohanchandra and G.P. Carman, "Composition and annealing effects on the mechanical properties of superelastic thin film nickel titanium," Smart Structures and Materials 2003, Proceedings of the SPIE, Volume 5053, pp. 230–238, 2003.
- [518] M. Wun-Fogle, J.B. Restorff, A.E. Clark and J.F. Lindberg, "Magnetization and magnetostriction of dendritic [112]  $\text{Tb}_x \text{Dy}_y \text{Ho}_z \text{Fe}_{1.95}$  (x + y + z = 1) rods under compressive stress." Journal of Applied Physics, 83(11), pp. 7279–7281, 1998.
- [519] M. Wuttig, L. Liu, K. Tsuchiya and R.D. James, "Occurrence of ferromagnetic shape memory alloys," *Journal of Applied Physics*, 87(9), pp. 4712–4717, 2000.

- [520] Y. Xiao and K. Bhattacharya, "Modeling electromechanical properties of ionic polymers," Smart Structures and Materials 2001, Proceedings of the SPIE, Volume 4329, pp, 292–300, 2001.
- [521] D. Xu, L. Wang, G. Ding, Y. Zhou, A. Yu and B. Cai, "Characteristics and fabrication of NiTi/Si diaphragm micropump," *Sensors and Actuators* A: Physical, 93(1), pp. 87–92, 2001.
- [522] M. Yamakita, N. Kamanichi, Y. Kaneda, K. Asaka and Z-W. Luo, "Development of artificial muscle actuator using ionic polymer with its application to biped walking robots," Smart Structures and Materials 2003, Proceedings of the SPIE, Volume 5051, pp, 301–308, 2003.
- [523] I.V. Yannas and A.J. Grodzinsky, "Electromechanical energy conversion with collagen fibers in an aqueous medium," *Journal of Mechanochemistry and Cell Motility*, 2, pp. 113–125, 1973.
- [524] J.M. Yeomans, Statistical Mechanics of Phase Transitions, Clarendon Press, Oxford, UK, 1992.
- [525] J-H. Yoo, J. Sirohi, N.M. Wereley and I. Chopra, "A magnetorheological hydraulic actuator driven by a piezopump," Smart Structures and Materials 2003, Proceedings of the SPIE, Volume 5056, pp, 444–456, 2003.
- [526] J.A. Young, B.L. Farmer and J.A. Hinkley, "Molecular modeling of the poling of piezoelectric polyimides," *Polymer*, 40, pp. 2787–2795, 1999.
- [527] O.C. Zienkiewicz and R.L. Taylor, *The Finite Element Method*, Butterworth– Heinemann, Boston, 2000.
- [528] D. Zwillinger, Editor-in-Chief, CRC Standard Mathematical Tables and Formulae, 30th Edition, CRC Press, Boca Raton, 1996.