Bibliography

[1] F. Abassi and A. J. Fletcher. Effect of transformation plasticity on generation of thermal stress and strain in quenched steel plates. *Materials science and technology*, 1:830–837, 1985.

[2] C. J. Adkins. *Equilibrium Thermodynamics.* Cambridge University Press, Cambridge, UK, 1983.

[3] C. Bailey, P. Chow, M. Cross, Y. Fryer, and K. Pericleous. Multiphysics modelling of the metals casting process. In *Proc. R. Soc. Lond. A*, volume 452, pages 459–486, 1996.

[4] C. Bailey and M. Cross. A finite volume procedure to solve elastic solid mechanics problems in three dimensions on an unstructured mesh. *Int. Journal for Num. Methods in Engg.*, 38:1757–1776, 1995.

[5] B. R. Baliga and S. V. Patankar. Elliptic systems: Finite-element method 2. In W. J. Minkowycz, E. M. Sparrow, G. E. Schneider, and R. H. Pletcher, editors, *Handbook of Numerical Heat Transfer*, chapter 11, pages 379–420. John Wiley and Sons, 1988.

[6] B. R. Baliga and S. V. Patanker. A new finite-element formulation for convection-diffusion problems. *Numerical Heat Transfer*, 3:393–409, 1980.

[7] B. R. Baliga and S. V. Patanker. A control volume finite-element method for two-dimensional fluid flow and heat transfer. *Numerical Heat Transfer*, 6:245–261, 1983.

[8] B. R. Baliga, B. R. Pham, and S. V. Patanker. Solution of some two-dimensional incompressible fluid flow and heat transfer problems, using a control volume finite-element method. *Numerical Heat Transfer*, 6:263–282, 1983.

[9] R. Barrett, M. Berry, and T. Chan et al. *Templates for the solution of linear systems: Building blocks for iterative methods.* SIAM, 1996.

[10] K. J. Bathe and E. L. Wilson. *Numerical Methods in Finite Element Analysis.* Prentice Hall, Inc., New Jersey, USA, 1976.

[11] G. Beer and J. O. Watson. *Introduction to finite and boundary element methods for engineers.* John Wiley and Sons Ltd., Chichester, UK, 1992.

[12] M. Bellet, F. Decultieux, M. Menai, F. Bay, C. Levaillant, J.-L. Chenot, P. Schmidt, and I. L. Svensson. Thermomechanics of the cooling stage in casting processes: Three-dimensional finite element analysis and experimental validation. *Metallurgical and Materials Transactions B*, 27B:81–99, 1996.

[13] M. Bellet, M. Menai, F. Bay, P Schmidt, and I. L. Svensson. Finite element modelling of the cooling phase in casting processes. In T. S. Piwonka, V. Voller, and L. Katgerman, editors, *Modeling of Casting, Welding and Advanced Solidification Processes VI*, pages 561–568, 1993.

[14] D. E. Bourne and P. C. Kendal. *Vector Analysis and Cartesian Tensors.* The Camelot Press Ltd., Southampton, UK, 1980.

[15] J. Campbell, editor. *Castings.* Butterworth-Heinemann Ltd., Oxford, UK, 1991.

[16] J. Campbell. Review of computer simulation versus casting reality. In M. Cross and J. Campbell, editors, *Modelling of Casting, Welding and Advanced Solidification Processes VII*, pages 907–913, 1995.

[17] H. S. Carslaw and J. C. Jaeger. *Conduction of heat in solids.* Oxford University Press, Oxford, UK, 1959.

[18] CFDS AEA Technology, Harwell, Oxon, UK. *FLOW3D.*

[19] CHAM Ltd., Wimbledon, London, UK. *PHOENICS.*

[20] P. Chow. *A Control Volume Unstructured Procedure for Convection-Diffusion Solidification Processes.* PhD thesis, The University of Greenwich, 1993.

[21] P. Chow, C. Bailey, M. Cross, and K. Pericleous. Integrated numerical modelling of the complete casting process. In M. Cross and J. Campbell, editors, *Modeling of Casting, Welding and Advanced Solidification Processes VII*, pages 213–221, 1995.

[22] P. Chow and M. Cross. An enthalpy control volume-unstructured mesh (cv-um) algorithm for solidification by conduction only. *Int. Journal for Num. Methods in Engg.*, 35:1849–1870, 1992.

[23] I. C. Cormeau. Numerical stability in quasi-static elasto/visco-plasticity. *Int. Journal for Num. Methods in Engg.*, 9:109–127, 1975.

[24] N. Croft, K. A. Pericleous, and M. Cross. PHYSICA: A multiphysics environment for complex flow processes. In C. Taylor and P. Durbetaki, editors, *Numerical Methods in Laminar and Turbulent Flow '95*, volume 2, pages 1269–1280, 1995.

[25] M. Cross. Development of novel computational techniques for the next generation of software tools for casting simulation. In T. S. Piwonka, V. Voller, and L. Katgerman, editors, *Modeling of Casting, Welding and Advanced Solidification Processes VI*, pages 115–126, 1993.

[26] M. Cross, C. Bailey, P. Chow, and K. Pericleous. Towards an integrated control volume unstructured mesh code for the simulation of all the macroscopic processes involved in shape casting. In J. L. Chenot, R. D. Wood, and O. C. Zienkiewicz, editors, *Numerical Methods in Industrial Forming Processes IV*, pages 787–792, 1992.

[27] J. A. Dantzig. Thermal stress development in metal casting processes. *Metallurgical Science and Technology*, 7[3]:133–178, 1989.

[28] M. S. Darwish, J. R. Whiteman, and M. J. Bevis. Numerical modelling of viscoelastic liquids using a finite-volume method. *Journal of Non-Newtonian Fluid Mechanics*, 45:311–337, 1992.

[29] K. Davey. An analytical solution for the unidirectional solidification problem. *App. Math. Modelling*, 17(12):658–663, 1993.

[30] A. J. Davies. *The finite element method: A first approach.* Clarendon press, Oxford, UK, 1980.

[31] I. Demirdzic and D. Martinovic. Finite volume method for thermo-elasto-plastic stress analysis. *Computer Methods in Applied Mechanics and Engineering*, 109:331–349, 1992.

[32] I. Demirdzic and S. Muzaferija. Finite volume method for stress analysis in complex domains. *Int. Journal for Num. Methods in Engg.*, 37:3751–3766, 1994.

[33] J. D. Denton. A time marching method for two- and three-dimensional blade to blade flows. Technical Report 3775, Reports and Memoranda, Aeronautical research council, 1974.

[34] G. E. Dieter. *Mechanical Metallurgy.* McGraw Hill, 1988.

[35] N. N. Dioh, A. Ivankovic, P. S. Leevers, and J. G. Williams. Stress wave propagation effects in split hopkinson pressure bar tests. *Proc. R. Soc. Lond. A*, 449:187–204, 1995.

[36] FEA Ltd., Forge House, Kingston-upon-Thames, UK. *LUSAS V11.0.*

[37] Femview Ltd., Leicester, UK. *FEMGEN/FEMVIEW.*

[38] R. T. Fenner. *Engineering elasticity: Applications of Numerical and Analytical Techniques.* Ellis Horwood Ltd., Chichester, UK, 1986.

[39] A. J. Fletcher and W. D. Griffiths. Heat transfer during vapour blanket stage of quench. *Materials science and technology*, 9(11):958–965, 1993.

[40] A. J. Fletcher and W. D. Griffiths. Quenching of steel plates in sodium polyacrylate solutions. *Materials science and technology*, 9(2):176–183, 1993.

[41] Fluent, Inc., Lebanon, NH, USA. *FLUENT.*

[42] Y. D. Fryer. *A Control Volume Unstructured Grid Approach to the Solution of the Elastic Stress-Strain Equations.* PhD thesis, The University of Greenwich, 1993.

[43] Y. D. Fryer, C. Bailey, M. Cross, and C.-H. Lai. A control volume procedure for solving the elastic stress-strain equations on an unstructured mesh. *Appl. Math. Modelling*, 15:639–645, 1991.

[44] N. P. Gray and G. C. Coyle. Verification of defect and temperature predictions for commercial software using a variable geometry t-plate casting. In M. Cross and J. Campbell, editors, *Modelling of Casting, Welding and Advanced Solidification Processes VII*, pages 849–856, 1995.

[45] D. S. Griffin and R. S. Varga. Numerical solution of plane elasticity problems. *J. Soc. Indust. Appl. Math.*, 11(4):1046–1056, 1963.

[46] J. Hattel and P. N. Hansen. Simulating distortion and residual stresses in castings using fdm techniques. In M. Rappaz, M. R. Ozgu, and K. W. Mahin, editors, *Modeling of Casting, Welding and Advanced Solidification Processes V*, pages 253–258, 1991.

[47] J. Hattel and P. N. Hansen. Analysis of thermal induced stresses in die casting using a novel control volume fdm-technique. In T. S. Piwonka, V. Voller, and L. Katgerman, editors, *Modeling of Casting, Welding and Advanced Solidification Processes VI*, pages 585–592, 1993.

[48] J. H. Hattel and P. N. Hansen. A control volume-based finite difference method for solving the equilibrium equations in terms of displacements. *Appl. Math. Modelling*, 19:210–243, 1995.

[49] M. Heinlein, S. Mukherjee, and O. Richmond. A boundary element method analysis of temperature fields and stresses during solidification. *Acta Mechanica*, 59:59–81, 1986.

[50] R. Hill. *The Mathematical Theory of Plasticity.* Clarendon Press, Oxford, UK, 1950.

[51] E. Hinton, editor. *NAFEMS Introduction to Nonlinear Finite Element Analysis.* NAFEMS, East Kilbride, Glasgow, UK, 1992.

[52] C. Hirsch. *Numerical Computation of Internal and External Flows: Fundamentals of Numerical Discretization*, volume 1. John Wiley and Sons, 1988.

[53] P. H. Hodge, G. N. White, and R. I. Providence. A quantitive comparison of flow and deformation theories of plasticity. *J. of Appl. Mech.*, 9:180–184, 1950.

[54] S. R. Idelsohn and E. Onate. Finite volumes and finite elements: Two 'good friends'. *Int. Journal for Num. Methods in Engg.*, 37:3323–3341, 1994.

[55] A. Ivankovic, I. Demirdzic, J. G. Williams, and P. S. Leevers. Application of the finite volume method to the analysis of dynamic fracture problems. *Int. Journal of Fracture*, 66:357–371, 1994.

[56] Jr. J. E. Jackson and M. S. Ramesh. The rigid-plastic finite-element method for simulation of deformation processing. In P. Hartley, I. Pillinger, and C. Sturgess, editors, *Numerical modelling of material deformation processes: Research, Development and Applications*, chapter 7, pages 148–178. Springer-Verlag, 1992.

[57] A. Jameson, W. Schmidt, and E. Turkel. Numerical solutions to the euler equations by finite volume methods using runge-kutta time-marching schemes. *AIAA*, 81:1259, 1981.

[58] P. Jeanmart and J. Bouvaist. Finite element calculation and measurement of thermal stresses in quenched plates of high-strength 7075 aluminium alloy. *Materials science and technology*, 1:765–769, 1985.

[59] W. Johnson and P. B. Mellor. *Engineering Plasticity.* The Camelot Press Ltd., Southampton, UK, 1973.

[60] J. O. Kristiansson. Thermal stresses in the early stage of solidification of steel. *Journal of thermal stresses*, 5:315–330, 1982.

[61] W. M. Lai, D. Rubin, and E. Krempl. *Introduction to Continuum Mechanics.* Pergamon Press Ltd., Oxford, UK, 1978.

[62] H. G. Landau, J. H. Weiner, and E. E. Zwicky. Thermal stress in a viscoelastic-plastic plate with temperature dependent yield stress. *J. of Appl. Mech.*, 27:297–302, 1960.

[63] R. W. Lewis and P. M. Roberts. Finite element simulation of solidification problems. In T. J. Smith, editor, *Modelling of Flow and Solidification of Metals*, pages 61–92, 1987.

[64] MAGMA GmbH, Achen, Germany. *MAGMAsoft.*

[65] P. V. Marcal and I. P. King. Elastic-plastic analysis of two-dimensional stress systems by the finite element method. *Int. J. Mech. Sci.*, 9:143–155, 1967.

[66] P. W. McDonald. The computation of transonic flow through two-dimensional gas turbine cascades. Technical Report 71-GT-89, ASME, 1971.

[67] M. Menai and M. Bellet. Thermomechanical coupling during solidification: a 3d finite element approach. In M. Cross and J. Campbell, editors, *Modeling of Casting, Welding and Advanced Solidification Processes VII*, pages 723–730, 1995.

[68] K. P Michalek, J.E. Kelly, and J.A Dantzig. Modeling of in-mold heat transfer in continuous castin of steel. In S. Kou and R. Mehrabian, editors, *Modeling of Casting, Welding and Advanced Solidification Processes*, pages 497–516, 1986.

[69] K. W. Morton and E. Suli. Finite volume methods and their analysis. *IMA Journal of Numerical Analysis*, 11:241–260, 1991.

[70] G. C. Nayak and O. C. Zienkiewicz. Elasto-plastic stress analysis. a generalization for various constitutive relations including strain softening. *Int. Journal for Num. Methods in Engg.*, 5:113–135, 1972.

[71] E. Onate, M. Cervera, and O. C. Zienkiewicz. A finite volume format for structural mechanics. *Int. Journal for Num. Methods in Engg.*, 37:181–201, 1994.

[72] D. R. J. Owen and E. Hinton. *Finite elements in plasticity: Theory and practice.* Pineridge Press Ltd., Swansea, UK, 1980.

[73] G. N. Pande, D. R. J. Owen, and O. C. Zienkiewicz. Overlay models in time-dependent non-linear material analysis. *Computers and Structures*, 7:435–433, 1975.

[74] S. V. Patanker. *Numerical Heat Transfer and Fluid Flow.* Hemisphere, Washington DC, 1980.

[75] S. V. Patanker and D. B. Spalding. A calculation procedure for heat, mass and momentum transfer in three-dimensional parabolic flows. *Int. J. of Num. Heat and Mass Transfer*, 15:1787–1806, 1972.

[76] P. Perzyna. The constitutive equations for rate sensitive plastic materials. *Quart. Appl. Mech.*, 20:321–332, 1963.

[77] P. Perzyna. Fundamental problems in visco-plasticity. *Advan. Appl. Mech.*, 9:243–377, 1966.

[78] N. Phan-Thien and R. I. Tanner. Boundary element analysis of forming processes. In P. Hartley, I. Pillinger, and C. Sturgess, editors, *Numerical modelling of material deformation processes: Research, Development and Applications*, chapter 6, pages 131–147. Springer-Verlag, 1992.

[79] C. Prakash and V. R. Voller. On the numerical solution of the continuum mixture model equations describing solid-liquid phase change. *Numer. Heat Transfer, Part B*, 15:171–189, 1989.

[80] C. M. Rhie and W. L. Chow. Numerical study of the turbulent flow past an airfoil with trailing edge separation. *AIAA J.*, 21:1525–1532, 1983.

[81] Rockfield Software Ltd., The Innovation Centre, University College of Swansea, UK. *Microfield V2.3.*

[82] P. Schmidt and I. L. Svensson. Heat transfer and air gap formation in permanent mould casting of aluminium alloys. Technical Report TRITA-MAC-0541, Materials research centre, The royal institute of technology, S10044 Stockholm 70, 1994.

[83] G. E. Schneider. Elliptic systems: Finite-element method 1. In W. J. Minkowycz, E. M. Sparrow, G. E. Schneider, and R. H. Pletcher, editors, *Handbook of Numerical Heat Transfer*, chapter 10, pages 379–420. John Wiley and Sons, 1988.

[84] V. Selmin. The node-centred finite volume approach: Bridge between finite differences and finite elements. *Computer Methods in Applied Mechanics and Engineering*, 102:107–138, 1992.

[85] B. Sirrell, M. Holliday, and J. Campbell. The benchmark test 1995. In M. Cross and J. Campbell, editors, *Modelling of Casting, Welding and Advanced Solidification Processes VII*, pages 915–933, 1995.

[86] I. M. Smith and D. V. Griffiths. *Programming the finite element method*. John Wiley and Sons Ltd., 1988.

[87] C. J. Smithells, editor. *Metals reference book*. Butterworth & Co. Ltd., London, UK, 1976.

[88] Swanson Analysis Systems, Inc., Houston, USA. *ANSYS V5.0*.

[89] G. A. Taylor, C. Bailey, and M. Cross. Material non-linearity within a finite volume framework for the simulation of a metal casting process. In D. R. J. Owen, E. Oñate, and E. Hinton, editors, *Fourth international conference on computational plasticity: Fundamentals and Applications: Pt. 2*, pages 1459–1470, 1995.

[90] G. A. Taylor, C. Bailey, and M. Cross. Solution of the elastic/visco-plastic constitutive equations: A finite volume approach. *Appl. Math. Modelling*, 19:746–760, 1995.

[91] P. S. Theocaris and E. Marketos. Elastic-plastic analysis of perforated thin strips of a strain-hardening material. *J. Mech. Phys. Solids*, 12:377–390, 1964.

[92] B. G. Thomas. Stress modelling of casting processes: An overview. In T. S. Piwonka, V. Voller, and L. Katgerman, editors, *Modeling of Casting, Welding and Advanced Solidification Processes VI*, pages 519–534, 1993.

[93] B. G. Thomas, I. V. Samarasekera, and J. K. Brimacombe. Mathematical model of the thermal processing of steel ingots: Part 2: Stress model. *Metallurgical Transactions B*, 18B:131–147, 1987.

[94] S. P. Timoshenko and J. N. Goodier. *Theory of elasticity*. McGraw-Hill, Inc., New York, USA, 1970.

[95] T. C. Tszeng and S. Kobayashi. Stress analysis in solidification processes: Application to continuous casting. *Int. J. Mach. Tools Manufact.*, 29(1):121–140, 1989.

[96] UES, Ohio, USA. *ProCAST*.

[97] V. R. Voller and C. R. Swaminathan. General source-based method for solidification phase change. *Numer. Heat Transfer, Part B*, 19:175–189, 1991.

[98] J. H. Weiner and B. A. Boley. Elasto-plastic thermal stresses in a solidifying body. *J. Mech. Phys. Solids*, 11:145–154, 1963.

[99] J. H. Weiner and B. A. Boley. *Theory of Thermal stresses*. John Wiley and Sons, Inc., New York, US, 1967.

[100] M. A. Wheel. A geometrically versatile finite volume formulation for plane elastostatic stress analysis. *Journal of strain analysis*, 31(2):111–116, 1996.

[101] A. M. Winslow. Numerical solution of quasi-linear poisson equation in a nonuniform triangle mesh. *J. Comput. Phys.*, 1(2):149–172, 1966.

[102] Wolfram Research, Inc., Champaign, Illinois, USA. *Mathematica V2.*

[103] Y. Yamada, N. Yoshimura, and T. Sakurai. Plastic stress-strain matrix and its application for the solution of elastic-plastic problems by the finite element method. *Int. J. Mech. Sci.*, 10:343–354, 1968.

[104] O. C. Zienkiewicz. Origins, milestones and directions of the finite element method - a personal view. In *Archives of Computational Methods in Engineering: State of the art reviews*, volume 2.1, pages 1–48. Int. Center for Num. Methods in Engg., Barcelona, Spain, 1995.

[105] O. C. Zienkiewicz and I. C. Cormeau. Visco-plasticity—plasticity and creep in elastic solids—a unified numerical solution approach. *Int. Journal for Num. Methods in Engg.*, 8:821–845, 1974.

[106] O. C. Zienkiewicz and E. Onate. Finite volumes vs finite elements. is there really a choice? In P. Wriggers and W. Wagner, editors, *Nonlinear computational mechanics*, chapter 4, pages 240–254. Springer-Verlag, 1991.

[107] O. C. Zienkiewicz and R. L. Taylor. *The finite element method: Volume 1: Basic formulation and linear problems.* Magraw-Hill, Maidenhead, Berkshire, UK, 1989.

[108] O. C. Zienkiewicz and R. L. Taylor. *The finite element method: Volume 2: Solid and fluid mechanics, dynamics and non-linearity.* Magraw-Hill, Maidenhead, Berkshire, UK, 1991.

[109] O. C. Zienkiewicz, S. Valliappan, and I. P. King. Elasto-plastic solutions of engineering problems 'initial stress', finite element approach. *Int. Journal for Num. Methods in Engg.*, 1:75–100, 1969.