

G

Oldies but Goodies

The following list is fairly comprehensive until about 1989. Since then many more books as well as revised editions of previous ones have appeared. Newer books usually emphasize the mathematical interpretation and thus are of limited usefulness to engineers. In fact the field by now can be safely characterized, to paraphrase T. S. Eliot, as an engineer's wasteland.

Recommendation: stick with the oldies. Unfortunately many are out of print.

§G.1 MATHEMATICALLY ORIENTED

A. K. Aziz (ed.), *The Mathematical Foundations of the Finite Element Method with Applications to Partial Differential Equations*, Academic Press, New York, 1972.

G. F. Carey and J. T. Oden, *Finite Elements IV: Mathematical Aspects*, Prentice Hall, Englewood Cliffs, N. J., 1983.

P. G. Ciarlet, *The Finite Element Method for Elliptic Problems*, North Holland, Amsterdam, 1978.

D. F. Griffiths (ed.), *The Mathematical Basis of Finite Element Methods*, Clarendon Press, Oxford, UK 1984.

A. R. Mitchell and R. Wait, *The Finite Element Analysis in Partial Differential Equations*, Wiley, New York, 1977.

J. T. Oden, *An Introduction to the Mathematical Theory of Finite Elements*, Wiley, New York, 1976.

G. Strang and G. J. Fix, *An Analysis of the Finite Element Method*, Prentice Hall, Englewood Cliffs, N. J., 1973.

R. Wait and A. R. Mitchell, *Finite Element Analysis and Applications*, Wiley, Chichester, UK, 1985.

E. L. Wachpress, *A Rational Finite Element Basis*, Wiley, New York, 1976.

O. C. Zienkiewicz and K. Morgan, *Finite Element and Approximations*, Wiley, New York, 1983.

§G.2 APPLICATIONS ORIENTED

K. J. Bathe, *Finite Element Procedures in Engineering Analysis*, Prentice Hall, Englewood Cliffs, N. J., 1982. Second edition entitled *Finite Element Analysis: From Concepts to Applications* has appeared in 1996.

K. J. Bathe and E. L. Wilson, *Numerical Methods in Finite Element Analysis*, Prentice Hall, Englewood Cliffs, N. J., 1976.

E. B. Becker, G. F. Carey and J. T. Oden, *Finite Elements III: Computational Aspects*, Prentice Hall, Englewood Cliffs, N. J., 198

G. F. Carey and J. T. Oden, *Finite Elements II: A Second Course*, Prentice Hall, Englewood Cliffs, N. J., 1981.

M. V. K. Chari and P. P. Silvester, *Finite Elements in Electrical and Magnetic Field Problems*, Wiley, Chichester, UK, 1984.

T. H. Chung, *The Finite Element Method in Fluid Mechanics*, McGraw-Hill, New York, 1978.

- R. D. Cook, D. S. Malkus and M. E. Plesha, *Concepts and Application of Finite Element Methods*, 3rd ed., Wiley, New York, 1989.
- A. J. Davies, *The Finite Element Method*, Clarendon Press, Oxford, UK, 1980.
- C. S. Desai, *Elementary Finite Element Method*, Prentice Hall, Englewood Cliffs, N. J., 1979.
- C. S. Desai and J. F. Abel, *Introduction to the Finite Element Method*, Van Nostrand, New York, 1972.
- G. Dhatt and G. Touzot, *The Finite Element Method Displayed*, Wiley, Chichester, UK, 1984.
- R. H. Gallagher, *Finite Element Analysis*, Prentice Hall, Englewood Cliffs, N. J., 1975.
- I. Holand and K. Bell (eds), *Finite Element Methods in Stress Analysis*, Tapir, Trondheim, Norway, 1969.
- K. H. Huebner, *The Finite Element Method for Engineers*, Wiley, New York, 1975.
- T. J. R. Hughes, *The Finite Element Method: Linear Static and Dynamic Finite Element Analysis*, Prentice Hall, Englewood Cliffs, N. J., 1987.
- B. Irons and S. Ahmad, *Techniques of Finite Elements*, Ellis Horwood Ltd, Chichester, UK, 1980.
- H. C. Martin and G. F. Carey, *Introduction to Finite Element Analysis*, McGraw-Hill, New York, 1973.
- J. T. Oden, *Finite Elements of Nonlinear Continua*, Wiley, New York, 1972.
- J. T. Oden and G. F. Carey, *Finite Elements I: An Introduction*, Prentice Hall, Englewood Cliffs, N. J., 1981.
- J. T. Oden and G. F. Carey, *Finite Elements V: Special Problems in Solid Mechanics*, Prentice Hall, Englewood Cliffs, N. J., 1984.
- J. S. Przemieniecki, *Theory of Matrix Structural Analysis*, McGraw-Hill, New York, 1968 (also in Dover ed).
- S. S. Rao, *The Finite Element Method in Engineering*, Pergamon Press, Oxford, 1982.
- J. Robinson, *Integrated Theory of Finite Element Methods*, Wiley, London, 1973.
- K. C. Rockey, H. R. Evans, D. W. Griffiths and D. A. Nethercot, *The Finite Element Method: A Basic Introduction for Engineers*, Collins, London, 1983.
- L. J. Segerlind, *Applied Finite Element Analysis*, Wiley, New York, 1976.
- P. Tong and J. N. Rosettos, *Finite Element Method*, MIT Press, London, 1977.
- O. C. Zienkiewicz, *The Finite Element Method in Engineering Sciences*, 3rd ed., McGraw-Hill, London, 1977. Partly superseded by Vol I of Zienkiewicz and Taylor, McGraw-Hill, 1988. Vol II appeared in 1993.

§G.3 SOFTWARE ORIENTED

J. E. Akin, *Application and Implementation of Finite Element Methods*, Academic Press, New York, 1982.

E. Hinton and D. R. J. Owen, *An Introduction to Finite Element Computations*, Pineridge Press, Swansea, 1979.

I. M. Smith, *Programming the Finite Element Method*, Wiley, Chichester, UK, 1982.

§G.4 RECOMMENDED BOOKS FOR LINEAR FEM

Basic level (reference): Zienkiewicz and Taylor (1988) Vols I (1988), II(1993). This is a comprehensive upgrade of the 1977 edition. Primarily an encyclopedic reference work that gives panoramic coverage of FEM, as well as a comprehensive list of references. Not a textbook. A fifth edition has appeared recently.

Basic level (textbook): Cook, Malkus and Plesha (1989). This third edition is fairly comprehensive in scope and fairly up to date although the coverage is more superficial than Zienkiewicz and Taylor.

Intermediate level: Hughes (1987). It requires substantial mathematical expertise on the part of the reader.

Mathematically oriented: Strang and Fix (1973). Still the most readable mathematical treatment for engineers, although outdated in many subjects.

Best value for the \$\$\$: Przemieniecki (Dover edition, 1985, about \$14). A reprint of a 1966 Mac-Graw-Hill book. Although woefully outdated in many respects (the word “finite element” does not appear anywhere), it is a valuable reference for programming simple elements. It contains a comprehensive bibliography up to 1966.

Most fun (if you appreciate British “humor”): Irons and Ahmad (1980)

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