matrices, and the small transverse vibrations of a beam. The final chapters give an account of the Gelfand-Levitan method for reconstructing the potential (or density) in Sturm-Liouville systems. The material here would be heavy going for a student whose background was weak enough to warrant study of the first two chapters: elementary matrix analysis and vibration of masses connected by springs. So much for the end conditions; the middle of the book, nearly half of it, in fact, presents a nice exposition of oscillation matrices and their use. Gladwell shares the enthusiasm of Gantmacher and Krein for determinants.

A revealing clue that this book was conceived as a text rather than a research monograph is the absence of an index. It is not easy to dip into one of the later chapters. There is no pointer to where certain symbols (such as S_v^+) are defined. The surprise here is that the author is in an engineering department and engineers are usually punctilious in collecting all their symbols in an obvious place. The complete absence for any numerical data to illustrate the efficacy of the reconstruction techniques for discrete problems makes me suspect that the author is an applied mathematician dressed in engineer's clothing. That possibility would be consistent with the author's interest in Pascal—the philosopher, not the language.

This well-focussed study presents material that is not easy to locate elsewhere. It provides a gateway to the world of inverse problems.

B.P.

12[65–06, 68–06].—J. S. KOWALIK & C. T. KITZMILLER (Editors), *Coupling Symbolic and Numerical Computing in Expert Systems*, II, North-Holland, Amsterdam, 1988, viii + 274 pp., 23 cm. Price $73.75/Dfl. 140.00.

This volume contains 19 papers presented at a second workshop on the subject held July 20–22, 1987 in Bellevue, Washington. For the first workshop, see [1]. The contributions reflect the interdisciplinary nature of the workshop, drawing from such fields as artificial intelligence, symbolic and numerical computation, and software development. About half of the papers address specific applications in science and engineering. The three papers with the strongest numerical analysis component discuss expert systems related issues in the stable evaluation of symbolically generated mathematical expressions and in finite difference methods and grid generation for partial differential equations.

W.G.

1. J. S. KOWALIK (ed.), *Coupling Symbolic and Numerical Computing in Expert Systems*, North-Holland, Amsterdam, 1986.