Equation in Unbounded Domains; and Chapter IX, Scattering Problems Depending on a Parameter. Elastic Structure-Fluid Interaction in Unbounded Domains.

All in all, it is a lovely book and long overdue.

REFERENCES

1. G. Gallovotti, *Elementary mechanics*, Springer-Verlag, New York, 1983.
2. T. Kato, *Perturbation theory for linear operators*, Springer-Verlag, Berlin, 1966.

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An introduction to the numerical analysis of spectral methods, by Bertrand Mercier. Lecture Notes in Phys., Springer-Verlag, Berlin, New York, 1989, 154 pp., $23.30. ISBN 3-540-51106-7

Spectral methods form a relatively young and vigorously expanding field of numerical analysis. In the last 10 to 15 years, they have been applied to a wide variety of problems of mathematics and engineering. Concomitantly, the theoretical analysis of these calculations has grown and diversified, although, as usual in practical applications, we still compute much more than we can prove. The interested reader can do no better than consult [1], which surveys the state-of-the-art situation in the late 80s, giving ample coverage to both theory and applications.

The basic ingredient of spectral methods is the expansion of the unknown quantities in the series of orthogonal functions; these functions, in turn, result from the solution of a Sturm–Liouville problem. In practice, one considers either Fourier expansions—usually for periodic problems—or expansions in terms of orthogonal polynomials. Among the latter, the Chebyshev polynomials play a distinguished role, as they are amenable to the fast Fourier transform, but also admit more general boundary values than those allowed in Fourier series.

Consider now a typical differential problem $Lu = f$, for the unknown u. After u is replaced by an N-term expansion in the