There is a great deal more covered in Lang's book than I have discussed here, e.g., Nevanlinna theory and the defect relations of Carlson-Griffiths, surely the foremost success of differential-geometric methods in the subject. Indeed, there is little of importance in the area that Lang set out to cover which he has not managed to include in either his book or survey article. If I had a student in this area, I would surely point to these two sources and say, "This is what you ought to learn." There are, as one might expect in a work of this scope, better places to learn some of the topics covered; however, nowhere else are even half of these topics all to be found together. Chapters 3 and 7, for example, contain material available nowhere else in book form. Lang has performed a tremendously important service to the subject.

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BULLETIN (New Series) OF THE
AMERICAN MATHEMATICAL SOCIETY
Volume 18, Number 2, April 1988

0273-0979/88 $1.00 + $.25 per page

Spectral geometry: Direct and inverse problems, by Pierre H. Bérard, with an appendix by G. Besson. Lecture Notes in Mathematics, Vol. 1207, Springer-Verlag, Berlin, Heidelberg, New York, London, Paris, Tokyo, 1986, xiii + 272 pp., $23.40. ISBN 3-540-16788-9

This interesting book deals with certain direct problems in Riemannian geometry. The notions of direct and inverse problems are not exact, but in general, by a direct problem one means a problem in which the goal is to derive information about the spectrum of the Laplace operator on a Riemannian manifold M from other geometric data associated with the manifold, while an inverse problem is one in which the deduction goes the other way, i.e., information about the spectrum is used to derive different geometric information about M.

For example, the Faber-Krahn result that among smooth domains in R^n of fixed volume the first Dirichlet eigenvalue is minimized by the ball is of a direct character, whereas the fact that the dimension of such a domain is determined by its Dirichlet spectrum is of an inverse character.

There is a very large body of results on these topics, with certain persistent and central themes, e.g., the effort to understand the asymptotic behavior of the spectrum. Strikingly, this behavior only depends, up to an asymptotically correct first approximation, on the dimension and Riemannian volume of M (cf. [**M-P**]). A related development has been the discovery of relationships which, formally at least, convey the exact geometric content of the spectrum,