HUTCHINSON, M. and BISCHOF, R. (1983). A new method for estimating the spatial distribution of mean seasonal and annual rainfall applied to the Hunter Valley, New South Wales. *Australia Meteorology Magazine* **31** 179–184.

NYCHKA, D. (1988). Confidence intervals for smoothing splines. *J. Amer. Statist. Assoc.* **83** 1134–1143.

NYCHKA, D., WAHBA, G., GOLDFARB, S. and PUGH, T. (1984). Cross-validated spline methods for the estimation of three-dimensional tumor size distributions from observations on two-dimensional cross sections. *J. Amer. Statist. Assoc.* **79** 832–846.

O'SULLIVAN, F. (1990). An iterative approach to two-dimensional Laplacian smoothing with application to image restoration. *J. Amer. Statist. Assoc.* **85** 213–219.

POGGIO, T. and GIROSI, F. (1990). Regularization algorithms for learning that are equivalent to multilayer networks. *Science* **247** 978–982.

STEWART, G. W. (1987). Collinearity and least squares regression (with discussion). *Statist. Sci.* **2** 68–100.

WAHBA, G. (1983). Bayesian "confidence intervals" for the cross-validated smoothing spline. *J. Roy. Statist. Soc. Ser. B* **45** 133–150.

WAHBA, G. (1990). *Spline Models for Observational Data*. SIAM, Philadelphia.

WAHBA, G. and WENDELBERGER, J. (1980). Some new mathematical methods for variational objective analysis using splines and cross-validation. *Monthly Weather Review* **108** 1122–1145.

DEPARTMENT OF STATISTICS
PURDUE UNIVERSITY
WEST LAFAYETTE, INDIANA 47907

DEPARTMENT OF STATISTICS
UNIVERSITY OF WISCONSIN
MADISON, WISCONSIN 53706

REJOINDER

JEROME H. FRIEDMAN

Stanford University

I thank the editors for inviting such a distinguished group of researchers to discuss this paper and the discussants for their valuable contributions. The discussants are among the leaders in the field of function approximation and estimation; it is therefore no surprise that their comments are so perceptive and stimulating. Many important suggestions are made for improving the MARS procedure. These discussions provide a clearer and deeper understanding of both the strengths and limitations of the MARS approach. Each of them raises many very important issues, some of which I respond to here. Space limitations preclude a more thorough discussion of all of the cogent points and innovative ideas presented.

Schumaker. I thank Professor Schumaker for providing the additional references, especially the recent ones that were not available in 1987 when I performed the main body of this work. Of the five that relate to multivariate adaptive approximation, only one [de Boor and Rice (1979)] presents a procedure that could possibly lead to a practical method in high dimensions. Their

Institute of Mathematical Statistics is collaborating with JSTOR to digitize, preserve, and extend access to *The Annals of Statistics*. www.jstor.org