REFERENCE

WHITTAKER, E. T. and ROBINSON, G. (1924). *The Calculus of Observations*. Blackie, London.

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I would like to thank Professor Huber for a most thought-provoking paper.

I will restrict myself to discussion of projection pursuit regression, in particular to describing an approach to PP regression different than and possibly complementary to that of linear combinations of ridge functions as introduced in Section 9. This approach may be called partial spline modelling. One models a function of, say, $k + d$ variables, parametrically in k variables and as a (thin plate) spline function in the remaining d variables. The role of projection pursuit is to determine which d of the $k + d$ variables must be splined. Partial spline modelling can also be extended to the context of GLIM models, whereby again the dependency on some variables is via the usual GLIM approach while the dependency on other variables is only "smooth." It will turn out that partial spline estimates are linear combinations of (uniquely determined) polynomials and shifted versions of certain spherically symmetric functions (in the d splined variables). These splines are known to nicely model in a nonparametric way the interaction effects among a small number of variables (provided there is enough data), so they in some sense have properties that are complementary to ridge function approximation, and thus may be expected to do well where ridge functions do not. The structure of these estimates hopefully allows the benefits of the lesser data requirements of parametric modelling where that is warranted, while doing smooth nonparametric regression where it is not. By analogy with Huber's definition of "interesting" as "nonnormal" in multivariate density estimation, one could define "interesting" in this context as having a dependence more complicated than that modellable by a low-degree polynomial. With that definition, projection pursuit with the models being proposed here would, if successful, identify the "interesting" directions, particularly if the choice of d is part of the "pursuit."

Several authors have proposed partial spline models with one splined variable, with notable success (Engle, Granger, Rice and Weiss, 1983; Green, Jennison and Seheult, 1983; Anderson and Senthilselvan, 1982; Shiller, 1984). In all of these interesting applications the choice of the (single) splined variable was dictated by the context, so that projection pursuit is not necessary. Gaver and Jacobs (1983), however, consider the problem of predicting low level stratus conditions at Moffet field using surface meteorological measurements of east and north wind velocity, temperature, dew point and existence or nonexistence of low level stratus on preceding days. They use subset selection combined with logistic