DISCUSSION

I suppose the message here is that no single adaptive regression technique can perform uniformly best on all examples, which echoes the point made by Professor Friedman in Section 2.

REFERENCES


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I like MARS. It looks like a good tool for pulling out the most useful parts of large interaction spaces. Most of my comments are directed at accounting issues: How many degrees of freedom are used in knot selection? How can the cost be lowered? At the end, there are some comments on how one might apply MARS to models for which fast updating is not available.

My main interest in MARS stems from work in computer experiments. In these applications, smooth functions of fairly high complexity are evaluated over high dimensional domains with no sampling error. I plan to use MARS on such functions evaluated over Latin hypercube designs [McKay, Conover and Beckman (1979)]. Some theory for linear modeling of nonrandom responses over such designs is given in Owen (1990).

When there is no noise, one expects that a larger number of knots might be warranted. It then becomes worthwhile to lower the price of a knot somehow.

**Degrees of freedom in broken line regression.** Consider the broken line regression model

\[
Y_i = b_0 + b_1 t_i + \beta (t_i - \theta)_+ + \varepsilon_i, \quad i = 1, \ldots, n,
\]

where \( t_1 \leq t_2 \leq \cdots \leq t_n \) are nonrandom with \( \sum t_i = 0 \) and \( \sum t_i^2 = n \sigma^2, \varepsilon_i \) are independent \( N(0,1) \) and \( b_0, b_1, \beta \) and \( \theta \) are parameters. Taking \( \beta = 0 \) in (1) yields a one-segment model. Taking \( \beta \neq 0 \) and \( t_1 < \theta < t_n \) yields a two-segment model. This model has been studied by Feder (1967), Hinkley (1969),