Mathematics > Statistics Theory

Adaptive confidence intervals for regression functions under shape constraints

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Adaptive confidence intervals for regression functions are constructed under shape constraints of monotonicity and convexity. A natural benchmark is established for the minimum expected length of confidence intervals at a given function in terms of an analytic quantity, the local modulus of continuity. This bound depends not only on the function but also the assumed function class. These benchmarks show that the constructed confidence intervals have near minimum expected length for each individual function, while maintaining a given coverage probability for functions within the class. Such adaptivity is much stronger than adaptive minimaxity over a collection of large parameter spaces.

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