

Convex Underestimators for Dynamic Optimization Problems

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Rigorous convex underestimators for a broad class of variational and optimal control problems are developed. These rely only on the functional form of a nonconvex variational or optimal control problem, and therefore are quite general. Solution of a convex underestimating problem generates a rigorous lower bound on the global solution of the corresponding nonconvex problem. Examples will be presented.

The notion of convex underestimators is used extensively in modern deterministic algorithms for the global optimization of nonconvex algebraic problems (NLP, INLP and MINLP). However, we have found that the application of variational convex underestimators to global optimization algorithms for variational problems does not proceed directly by analogy with the algebraic case. Progress on global optimization algorithms for problems of special structure will be reported.