



Global Optimization Method for Continuous-Time Sensor Scheduling

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Abstract: We consider a situation in which several sensors are used to collect data for signal processing. Since operating multiple sensors simultaneously causes system interference, only one sensor can be active at any one time. The problem of scheduling the operation of the sensors to minimize signal estimation error is formulated as a discrete-valued optimal control problem. This problem cannot be solved using conventional optimization techniques. We instead transform it into an equivalent mixed discrete optimization problem. The transformed problem is then decomposed into a bi-level optimization problem, which is solved using a discrete filled function method in conjunction with a conventional optimal control algorithm. Numerical results show that our algorithm is robust, efficient, and reliable in attaining a near globally optimal solution.

Keywords: *sensor scheduling; time scaling transformation; discrete filled function; optimal control; mixed discrete optimization.*

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