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Tze Leung Lai, Tiong Wee Lim and Kevin J Ross* (kjross@stanford.edu), Department of Statistics - Sequoia Hall, 390 Serra Mall, Stanford University, Stanford, CA 94305-4065. *A new approach to singular stochastic control with applications to optimal hedging and investment-consumption under transaction costs.*

We present a new approach to numerical computation of optimal policies for singular stochastic control problems. Beginning with a class of singular stochastic control problems that can be transformed to optimal stopping problems, we use the equivalence with optimal stopping to develop an efficient numerical algorithm based on backward induction. We then use the method of finite differences to modify the backward induction algorithm for much more general stochastic control problems. We apply the method to compute optimal strategies in problems of finite-horizon optimal investment and consumption and of option pricing and hedging in the presence of transaction costs. (Received September 11, 2007)