A Robust Optimization for Multi-Period Lost-Sales Inventory Control Problem

Authors : Shunichi Ohmori, Sirawadee Arunyanart, Kazuho Yoshimoto

Abstract : We consider a periodic review inventory control problem of minimizing production cost, inventory cost, and lost-sales under demand uncertainty, in which product demands are not specified exactly and it is only known to belong to a given uncertainty set, yet the constraints must hold for possible values of the data from the uncertainty set. We propose a robust optimization formulation for obtaining lowest cost possible and guaranteeing the feasibility with respect to range of order quantity and inventory level under demand uncertainty. Our formulation is based on the adaptive robust counterpart, which suppose order quantity is affine function of past demands. We derive certainty equivalent problem via second-order cone programming, which gives 'not too pessimistic' worst-case.