

Approximation Algorithms for Stochastic Inventory Control Models

Levi, et. al

Andrew Benton

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- ▶ Studies problems with the following properties:
 - ▶ single item
 - ▶ finite horizon
 - ▶ correlated and nonstationary demand
- ▶ Introduces ideas which allow MDP's to be avoided.
 - ▶ *Marginal Cost Accounting*
 - ▶ *Cost Balancing*
- ▶ Guarantees constant worst-case performance policies for:
 - ▶ Periodic Review Stochastic Inventory Control Problem
 - ▶ Stochastic Lot-Sizing Problem

New Ideas Introduced

Marginal Cost Accounting

- ▶ Costs in the Markov Decision Process:
 - ▶ **Current Costs**: a function of current demand and current order.
 - ▶ **Future Costs**: a function of future demand and future orders.
- ▶ Costs in the Marginal Cost Accounting:
 - ▶ **Current Costs**: a function of current demand and current order.
 - ▶ **Future Costs**: a function of future demand.
- ▶ The overall holding costs of ordered units over full horizon are due to the current decision.
- ▶ Once an order is made, those unit's holding costs are independent of any future decision.

New Ideas Introduced

Cost Balancing

- ▶ Any policy incurs costs due to overordering and underordering.
- ▶ An effective policy can balance these costs.
- ▶ Balancing leads to constant expected worst-case performance.