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# NP-hard and polynomial cases for the single-item lot sizing problem with batch ordering under capacity reservation contract

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**Highlights**

- Single-item lot sizing problem is studied under a capacity reservation contract
- Batch deliveries are allowed and the overall replenishment cost is stepwise
- Four NP-hard cases are identified and an efficient FPTAS is proposed
- Pseudo-polynomial time dynamic programming algorithm is given for the general case
- Polynomial time algorithms are proposed under restricted parameters

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