Sequencing Problems for Periodic Job Shops : an MIP Model, Decomposition, and Complexity

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We consider the periodic job shop scheduling problem, a problem where an identical mixture of items is repetitively produced. The objective is to maximize the throughput rate of the mixtures or to minimize the cycle time. We present a mixed integer program to determine processing sequence of operations at each machine that minimizes the cycle time. It is shown that the mixed integer program can be decomposed into subproblems by some subgraph in an associated graph. For the case where each item has at most two operations, a polynomial-time optimal algorithm is presented. The problems except the case are proved to be NP-complete.