CONSTRUCTION OF CYCLIC SCHEDULING WITH DUPLICATED MACHINES[1]

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In this paper we consider the situation where N identical jobs have to be processed on assembly line with m types of machines. There is technological route for job with n successively processing operations $O_1, O_2, \ldots, O_n$. Each operation O_j is described by a processing time p_j and machine m_j, $j = 1, 2, \ldots, n$. Machines in technological rout can repeat. Interruption of operations are forbidden. Simultaneously processing of two or more operations on one machine is impossible. Schedule in which the same tasks for different jobs begin processed through constant time period, named *cyclic*. Need to build permissible schedule with minimal cycle length. This is polinomial problem with cycle length equal to sum of tasks time for the most loaded machine.

Sometimes in practice one of tasks O_l takes much more time than other ones. In this case it is possible to make cycle length shorter if we begin to use more machines of m_l type. So we want to minimize cycle length C for schedule of processing N identical jobs and ability to use simultaneously several parallel machines for some types of machines. This problem is also polinomial.

The other important property of cyclic schedule is H – count of simultaneously processed jobs. If the number of simultaneously process jobs limited by value H, than the problem is NP-hard [1], the pseudopolinomial algorithm is known for fixed H [2].

In this paper we represent an algorithm for build cyclic schedule of processing N identical jobs with parallel machines and limited number of simultaneously processed jobs with minimal cycle length. The algorithm is based on dynamical programming and it laboriousness is $O((2P)^{2H-1}H^H e^H)$, where $P = \sum\limits_{j=1}^{n} p_j$.

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