

# Polynomial algorithm for Baptiste's problem for single machine with preemptions of jobs

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## 1 Keywords

one-machine scheduling, generalized Smith's rule

## 2 Abstract

We consider the following problem of scheduling theory. On a machine it is necessary to process a set of jobs  $N = \{1, 2, \dots, n\}$ . Simultaneous processing is prohibited, but interrupts in processing jobs is possible. Each job  $i$  of the set  $N$  characterized by its weight  $w_i$ , release date  $r_i = i - 1$  and processing time  $p_i = 2$ . The only restriction is that weights  $w_i$  are non-decreasing. The objective function can be expressed as the sum of weighted completion times

$$\min \sum_{i=1}^n (w_i c_i).$$

We suggest the polynomial algorithm with complexity  $O(n^4)$  which gives us the Pareto - optimal schedule  $\pi$  for each set of jobs  $N$ . In this algorithm we use generalized Smith's rule, to obtain particular schedules after moment  $r_n$  and to prove some important lemmas.