

# Solvers: Minimize Maximum Stretch time during Process Scheduling

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## I. PROBLEM

**Input:**  $n$  tasks of processing time  $p_i$  to schedule on one processor and release time  $r_i$ .

**Output:** For each task, a start time  $\sigma_i \geq 0$ . Task  $i$  can not start before it is released:  $\sigma_i \geq r_i$ . Task  $i$  completes at  $C_i = \sigma_i + p_i$ . No two tasks can be excuting at the same time:  $\forall i, j [\sigma_i; C_i] \cap [\sigma_j; C_j] = \emptyset$

**Metric:** The flow time of a task is the time that elapsed between its release and completion:  $F_i = C_i - r_i$ . The stretch of a task is its Flow time normalized by its processing time:  $S_i = \frac{F_i}{p_i}$ . Minimize maximum stretch:  $S_{max} = \max_i S_i$

## II. IMPORTANCE OF THE PROBLEM

This problem performs the task of taking into consideration flow time, and processing time, which will account for time taken of a process and the resulting schedule designed will be more efficient. The following are applications of this problem:

- Scheduling transport of goods in large industries.
- Minimizing total cost of a telecommunication networks by optimizing topology.  
(An expanded case of this problem).
- Production Planning.