Δ-Schedulers

A scheduler whose operation is entirely determined by a matrix of constants $(\Delta_{j,k})_{j,k\in\mathcal{N}}$.

- The followings are Δ-schedulers:
  - FIFO: $\Delta_{j,k} = 0$
  - SP, BMux: $\Delta_{j,k} = \begin{cases} -\infty & \text{if flow j has higher priority} \\ +\infty & \text{if flow k has higher priority} \end{cases}$
  - EDF: $\Delta_{j,k} = d_j^* - d_k^*$
- GPS is not a Δ-scheduler.

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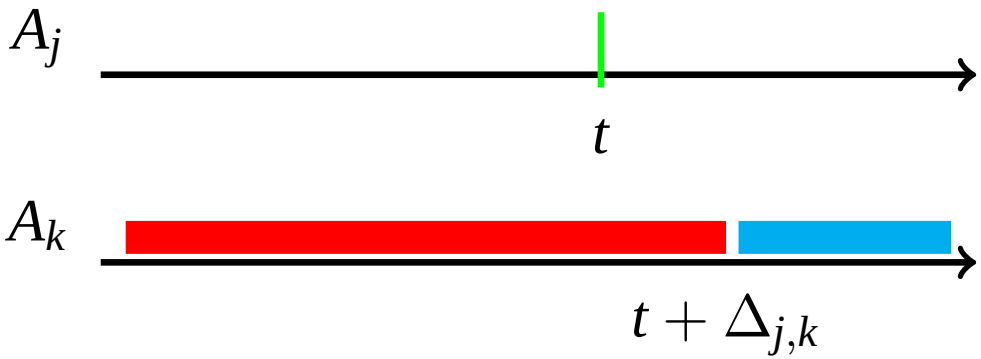

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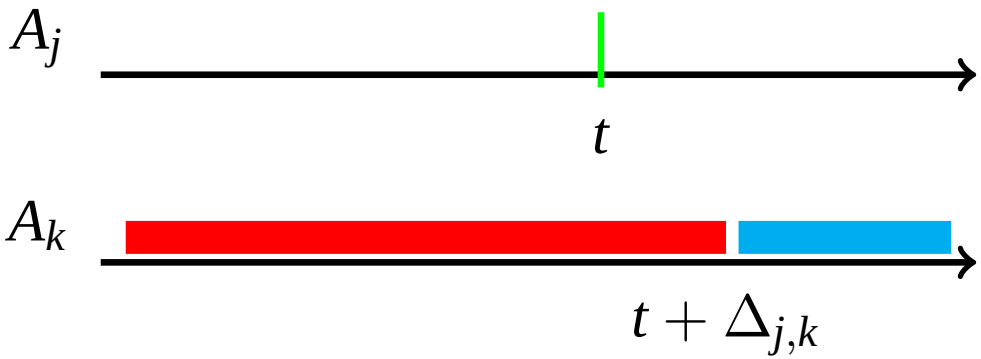

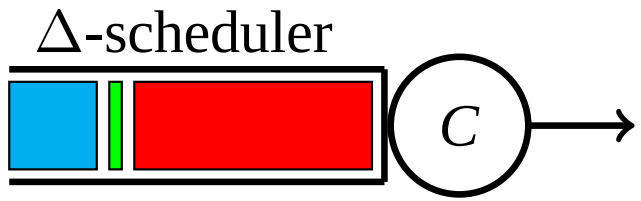

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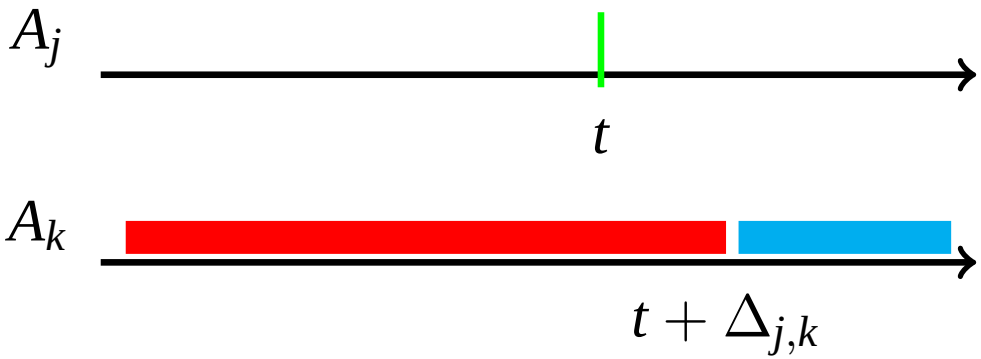

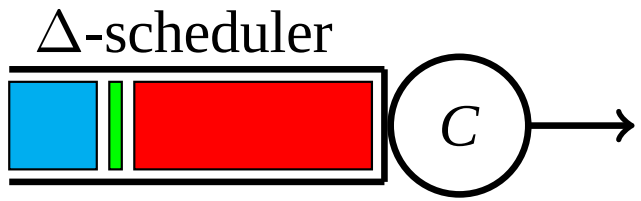

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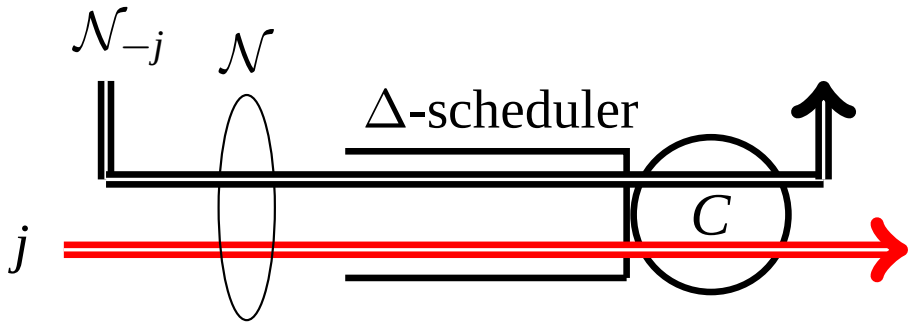
A Service Curve for Δ-Schedulers



Δ-service curve (Liebeherr, Ghiassi, Burchard'10)

For each $\theta \geq 0$, the following is a minimum service curve for flow j

$$\mathcal{S}_j(t;\sigma_s) = \left[Ct - \sum_{k \in \mathcal{N}_{-j}} \mathrm{E}_k\left(t - \theta + \Delta_{j,k}(\theta)\right)\right]_+ I_{t>\theta}$$

where $\Delta(a) = \min(a, \Delta)$

$_{-j}$

Provides necessary and sufficient delay bound constraints.