

Scheduling analysis

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System Requirement

Task

- **Task:** Schedule the following task set using rate-monotonic:
T1 {P: 5, E: 2.5, D: 5}, T2 {P: 15, E: 4.5, D: 15}, T3 {P: 20, E: 3.5, D: 20}
 - Calculate the Urm.
 - Calculate the time-demand analysis.
 - Model the task set using Simso.
- **Provide a report with the above points using screenshots and comments on your results and analysis.**

Calculate the Urm:

Task 1: P: 5, E: 2.5, D: 5

Task 2: P: 15, E: 4.5, D: 15

Task 3: P: 20, E: 3.5, D: 20

- $U = (2.5/5) + (4.5/15) + (3.5/20) = 0.975$

- $U_{rm} = 3 \cdot (2^{1/3} - 1) = 0.799$

- $U > U_{rm}$

- System needs more tests.

Calculate the time-demand analysis:

Task 1: P: 5, E: 2.5, D: 5

Task 2: P: 15, E: 4.5, D: 15

Task 3: P: 20, E: 3.5, D: 20

Assume that Task 1 has the highest priority:

- calculate time demand for T1 at time instant = D= 5:

$$W(5) = 2.5 + 0 = 2.5.$$

$$W(5) < D = 2.5 < 5$$

- T1 is schedulable.

Assume that Task 2 has the second highest priority:

- calculate time demand for T1 at time instant = D= 15 :

$$W(15) = 4.5 + (15/5) * 2.5 = 12 .$$

$$W(15) < D = 12 < 15$$

- T2 is schedulable.

Assume that Task 3 has the lowest priority:

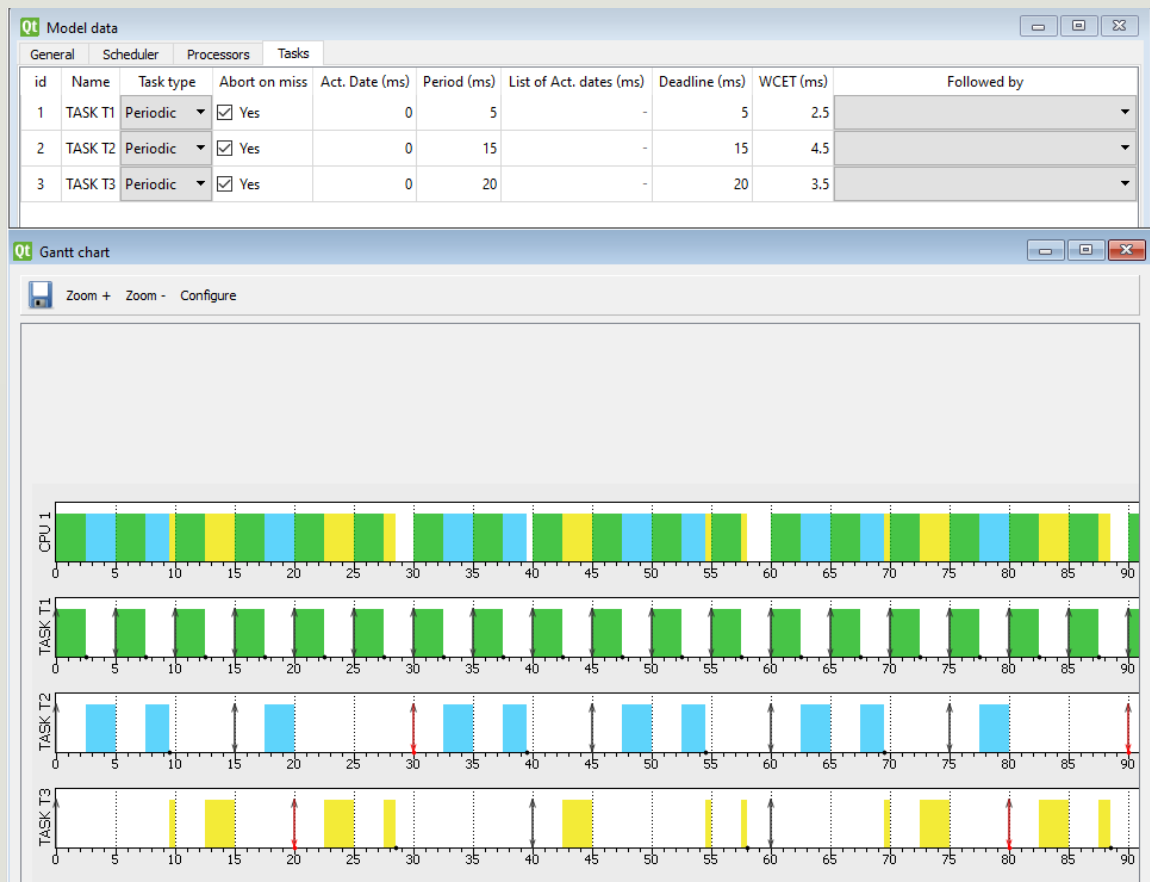
- calculate time demand for T1 at time instant = D= 20:

$$\begin{aligned} - W(20) &= 3.5 + (20/15) * 4.5 + (20/5) * 2.5 \\ &= 3.5 + 2(\text{round up}) * 4.5 + 4 * 2.5 = 22.5 \end{aligned}$$

$$- W(20) > D = 22.5 > 20$$

- T2 is not schedulable.

Modeling the system using Simso:



* The system is not schedulable, and it approves the analytical Rate-Monotonic utilization and time-demand analysis result as the system not schedulable at all of them.

* Task 2 and Task 3 missing deadlines.

