

ECE 6970: Solutions to Real-Time Systems Homework 1

(1) Plug in the execution times and periods into the schedulability equations. For example, in part (a), the periods are 4, 8, and 9. T_1 is schedulable since $e_1 \leq P_1$. T_2 is schedulable since $e_1 + e_2 \leq P_1$. T_3 is schedulable since $2e_1 + e_2 + e_3 \leq P_2$.

(3) Again, using the necessary and sufficiency equations for RM, we can show that $e_1 = 1.5$ is the maximum value for which this task set is schedulable under RM. For EDF, use the fact that the utilization must not exceed 1, i.e., $e_1/5 + 4/8 + 1/11 \leq 1$, which gives a maximum value of e_1 of 2.046.

(4) The task set in Question 3 is an example! If we had set $e_1 = 2.04$, it would have been EDF-schedulable but not RM-schedulable.

(5) Assume we are using the EDF algorithm (since the question did not specify the scheduling algorithm, you are entitled to pick whichever is easier). Now, the constraints of the task set with *every* having a deadline greater than its period are no greater than that of the task set with deadline equal to its period (it would be different if some deadlines were greater and some smaller than their corresponding periods). So, checking that the total utilization is no greater than 1 is enough.