

Homework1

(Due – tentatively – on October 16th, 2001)

The following exercises will be good preparations for the coming exam. **Keep your answers short!**

1. 4.3 in J.Liu's book.
2. 4.5 in J.Liu's book.
3. 5.1 (c) and (f) in J.Liu's book.
4. 6.3 in J.Liu's book.
5. 6.9 in J.Liu's book.
6. 6.21 in J.Liu's book.
7. 6.37 in J.Liu's book.
8. 8.3 in J.Liu's book.
9. What is the schedulable utilization for (non-preemptive) Shortest-Execution-Time-First for periodic tasks with relative deadline at the end of the period? Prove that your answer is correct. **Limit yourself to a single page!**
10. The time demand schedulability test on page 137 in J. Liu's book is expensive for systems with large period ratios. This is because the time demand curve is tested at every invocation of tasks with same or higher priority. A simpler – sufficient, but not necessary – schedulability test can be derived, which tests just at the deadline of the task under consideration. The general idea would be that, for Task T_i to be schedulable, the sum of its execution time and the amount of time Task T_i where T_i is prevented from executing due to higher-priority tasks can not be larger than D_i . More formally, the test would look as follows:

$$e_i + I_i \leq D_i \quad . \quad (1)$$

Derive a formula for I_i . (Note: The accuracy of this schedulability test depends on the accuracy of your formula for I_i . The credit you will get in this problem depends on both the correctness *and the accuracy* of your result.)