

ACM 30020

Structure of Final Exam

April 25th 2025

There will be five questions on the final exam and you must answer all of them. The questions will be a mixture of **examinable theorems** and questions from the weekly exercises. The latter will be taken word-for-word from the weekly exercises.

In addition, **one of the five questions will be completely unseen**, but this will be similar in style to the weekly exercises. Of course, the difficulty level will be lower, such that it will be feasible to obtain a correct answer in the time-frame of the two-hour exam.

The weekly exercises range from Exercises #1 to Exercises #7. In principle, anything from these exercises could be asked, **except Exercises #7 Question 4, which will not be examinable.**

Only five theorems are examinable. These are:

1. Well-posedness of IVPs: existence, uniqueness, and continuous dependence on initial conditions (Section 1.4, Section 1.5)
2. Gronwall's Inequality (Lemma 2.1)
3. Showing that the solution of the self-adjoint second-order linear IVP can be written as a Volterra integral (Section 4.4)
4. Showing that the eigenvalues of the FIE with symmetric kernel are real and that the eigenfunctions are orthogonal (Theorem 8.1, Theorem 8.2)
5. Sturm Comparison Theorem (Theorem 11.4)