Random Processes Spring 2026: Homework IV

March 13th, 2026

Problem 1. Prove the Kolmogorov 0-1 Law (you can look up the notes by Prof. Leveque, but are responsible for submitting your own explanation of the proof). In the process, describe two more examples of tail events.

Problem 2. Compute the characteristic function of a Gaussian $\mathcal{N}(\mu, \sigma^2)$ random variable.

Problem 3. Prove the CLT following the proof outlined in Prof. Leveque's notes (which does not use the characteristic function).

Problem 4. Prove Markov's and Chebyshev's inequality.

Problem 5. Prof. Hajek's text, 2.23, 2.24, 2.29, 2.33.