

Random Processes, Spring 2026: Homework VI

April 16th, 2026

Problem 1. Define Doob's martingales and prove that they are indeed martingales. Use Doob's martingales to prove McDiarmid's inequality. You are allowed to consult proofs from external sources, the important thing is that you write your solution down independently after reading about it, and not use LLMs for this purpose.

Problem 2. Problem 4.7, Prof. Hajek's text.

Problem 3: Problem 4.9, Prof. Hajek's text.

Problem 4: Problem 4.10, Prof. Hajek's text.

Problem 5: Problem 4.11, Prof. Hajek's text.

Problem 6: Problem 4.22, Prof. Hajek's text.

Note that some of the problems have solutions in the textbook itself. Nevertheless, please attempt to solve every problem independently and only use the text to compare your solutions to the correct answer.