EECS 126: Probability and Random Processes

Discussion 9

Note: Please work on the problems before the discussion session.

Problem 16. Let X be uniform on $[0, 2]$ and let Y be uniform on $[3, 4]$. Assume that X and Y independent. Find and sketch the PDF of $Z = X + Y$, using convolutions.

Problem 20. Let X be a discrete random variable with PMF p_X and let Y be a continuous random variable, independent from X, with PMF f_Y. Derive a formula for the PDF of the random variable $X + Y$.

Problem 24. The random variables X and Y are described by a joint PDF which is constant within the unit area quadrilateral with vertices $(0, 0)$, $(0, 1)$, $(1, 2)$, and $(1, 1)$. Use the law of total variance to find the variance of $X + Y$.

Problem 17. Let Y be exponentially distributed with parameter 1, and let Z be uniformly distributed over the interval $[0, 1]$. Use convolution to find the PDF of $|Y - Z|$.