MAS291 - Assignment 2

Instructor: Dr. Nguyen Viet Anh

February 20, 2022

Deadline: Sunday, 27/02/2022.
How to submit: via Google Classroom.
You must submit your assignment in a **single PDF** file. It's allowed that two students can work and submit one copy together (but you can also do alone). But cheating is not allowed! If detected, you will get zero. Two points are reserved for presentation.

Exercise 1

(2pts) Let X and Y be independent exponential variables with parameters α and β respectively. Compute the PDF, CDF and expected value of $U = \min(X, Y)$.

Exercise 2

(3pts) Let X and Y be independent uniform variables on $[0, 1]$ and $[-1, 1]$ respectively.

1. Is X^3 also uniform on $[0, 1]$? Justify your answer by calculating its PDF and CDF.
2. Calculate $P(X < Y^2)$.
3. Compute $P(|X - Y| < \frac{1}{2})$.

Exercise 3

(3pts) Find the constants which make the following functions probability densities. You are required to do the integrals manually step by step (that is, no calculator is accepted).

1. $f(x) = Ax^2e^{3x}$ for $x \in [0, 1]$, and $= 0$ otherwise.
2. $g(x) = B\sin^3(2x)$ for $x \in [0, \frac{\pi}{2}]$, and $= 0$ otherwise.