MATH48181/68181: EXTREME VALUES AND FINANCIAL RISK
SEMESTER 1
QUIZ PROBLEM 7
(Deadline: Tuesday 22 December 2020, 12:00noon)

Let X represent loss and suppose $x_1, x_2, \ldots, x_n$ is a random sample on X. Suppose that the probability density function of X is given by

$$f(x) = \frac{1}{2a} \exp\left(-\frac{|\, x \,|}{a}\right)$$

where $a > 0$ and $-\infty < x < \infty$. Show that

$$\mathrm{VaR}_p(X) = \begin{cases} -a \log\left[2(1-p)\right], \text{if } p > 1/2, \\ a \log\left[2p\right], \text{if } p \leq 1/2 \end{cases}$$

and determine its maximum likelihood estimator. Please give full details.

This problem is worth 1 mark. Marking scheme: 1 mark if the answer is correct, and the derivation is correct and detailed enough; 0.5 mark if the answer is correct, and the derivation is incorrect or not detailed enough; 0.5 mark if the answer is incorrect or not given, but the derivation is correct and detailed enough; 0 mark if the answer is correct, but the derivation is not detailed enough; 0 mark if the answer is incorrect, and the derivation is not detailed enough.

Please upload your solution to Blackboard. I will mark your solutions and email your mark, feedback and scanned work to you within 24 hours of the deadline. PLEASE DO NOT FORGET TO WRITE YOUR FULL NAME AND ID.