

MATH48181/68181: EXTREME VALUES AND FINANCIAL RISK
SEMESTER 1

QUIZ PROBLEM 6

(Deadline: 11:00am on Wednesday, 24 November 2021)

Suppose a portfolio is made of up of two independent investments. Let X and Y denote the losses. Assume that X and Y have the probability density functions

$$f_X(x) = a \exp(-ax)$$

and

$$f_Y(y) = b \exp(-by),$$

respectively, for $x > 0$, $y > 0$, $a > 0$ and $b > 0$. Derive the probability density and cumulative distribution functions of the total portfolio loss. 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 use Blackboard to submit your answer.