ASSIGNMENT 2

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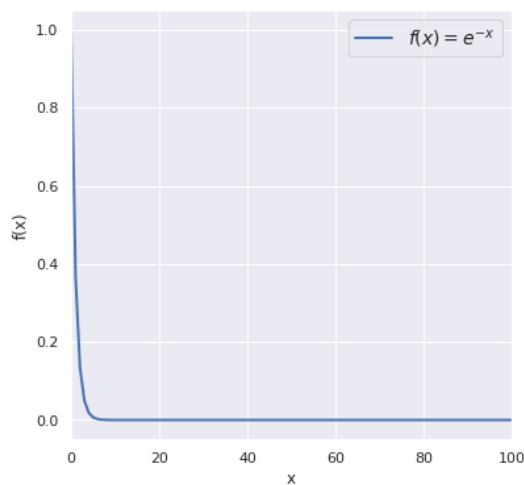and latex-tikz codes from
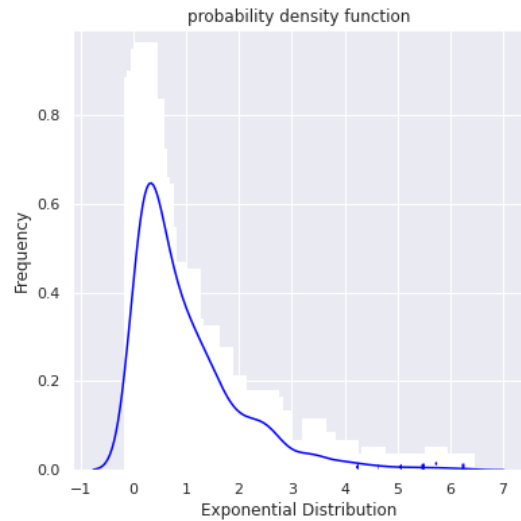
1 Problem.GATE.14

A continuous random variable X has a probability density function $f(x) = e^{-x}, 0 < x < \infty$. Then $P(X > 1)$ is

2 Solution

Given,

$$f(x) = e^{-x}, 0 < x < \infty \qquad (2.0.1)$$

We have to find $\Pr(X > 1)$,

$$\Pr(X > 1) = \int_1^\infty f(x)\,dx \qquad (2.0.2)$$

Using (2.0.1) in (2.0.2)

$$\Pr(X > 1) = \int_1^\infty e^{-x}\,dx \qquad (2.0.3)$$

$$= \left[-e^{-x}\right]_1^\infty \qquad (2.0.4)$$

$$= (-e^{-\infty}) - (-e^{-1}) \qquad (2.0.5)$$

$$= e^{-1} \qquad (2.0.6)$$

$$\implies \Pr(X > 1) = \frac{1}{e} \qquad (2.0.7)$$