Assignment 1

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1 PROBLEM

Let $\Omega = (0, 1]$ be the sample space and let $P(.)$ be a probability function defined by

$$P((0, x]) = \begin{cases} x/2, & 0 < x < 1/2 \\ x, & 1/2 \leq x \leq 1 \end{cases}$$

Then $P(\{\frac{1}{2}\}) =$

2 SOLUTION

Given that,

$$P((0, x]) = \begin{cases} x/2, & 0 < x < 1/2 \\ x, & 1/2 \leq x \leq 1 \end{cases}$$

that means Probability of the variable being only $\frac{1}{2}$ is

$$\begin{aligned}
P(\{1/2\}) &= P((0, 1/2]) - P((0, 1/2)) \\
&= \frac{1}{2} - \lim_{x \to \frac{1}{2}^-} P((0, x]) \\
&= \frac{1}{2} - \lim_{x \to \frac{1}{2}^-} \frac{x}{2} \\
&= \frac{1}{2} - \frac{1}{4} \\
&= \frac{1}{4} = 0.25
\end{aligned}$$