

# Assignment 1

Muttareddy Sahil Chandra - CS20BTECH11033

Download all python codes from

<https://github.com/SAHIL150602/AI1103/blob/main/Assignment2/codes/Assignment2.py>  
[https://github.com/SAHIL150602/AI1103/blob/main/Assignment2/codes/Assignment2\\_figure.py](https://github.com/SAHIL150602/AI1103/blob/main/Assignment2/codes/Assignment2_figure.py)

and latex-tikz codes from

<https://github.com/SAHIL150602/AI1103/blob/main/Assignment2/Assignment2.tex>

## 1 PROBLEM

Let  $\Omega = (0, 1]$  be the sample space and let  $P(\cdot)$  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

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