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Question 10.13.2.6 Probability and Random Processes

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Ouestion 10.13.2.6:

A game consists of spinning an arrow which comes to rest pointing at one of the regions (1, 2 or 3) (Fig. 13.1). Are the outcomes 1, 2 and 3 equally likely to occur? Give reasons.

$$P_X(k) = \begin{cases} 0.25 & \text{, for k=1} \\ 0.25 & \text{, for k=2} \\ 0.5 & \text{, for k=3} \end{cases}$$

 $P_X(k)$ are not equal for all k. Therefore, the events are not equally likely.

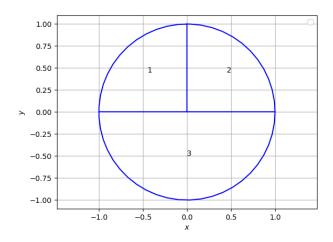


Fig. 0. Fig:13.1

Solution:

Let, the probability mass function

 $P_X(k)$ = Probability of the arrow to rest in region k

$$P_X(k) = \frac{\text{Angle covered by region k}}{\text{Total angle}}$$
(1)

$$\therefore P_X(1) = \frac{90^{\circ}}{360^{\circ}} = \frac{1}{4}$$
(2)

$$= 0.25$$
(3)

$$P_X(2) = \frac{90^{\circ}}{360^{\circ}} = \frac{1}{4}$$
(4)

$$= 0.25$$
(5)

$$P_X(3) = \frac{180^{\circ}}{360^{\circ}} = \frac{1}{2}$$
(6)

(7)