

Simulation 4

$$a) \quad V \sim U[a, b]$$

$$V = a + R(b-a), \quad R \sim U[0, 1]$$

$$\begin{aligned} \text{Time taken for a native} &= \frac{L}{V} \\ &= \frac{L}{a + R(b-a)} \end{aligned}$$

$$\text{Average speed} = \frac{a+b}{2} = \frac{3+7}{2} = 5$$

$$\begin{aligned} \text{Average time to cross} &= \frac{L}{V_{\text{avg.}}} \\ &= \frac{84}{5} = 16.8 \text{ seconds} \end{aligned}$$

But the simulation is giving around 18 seconds, so let me try something different.

$$\text{Average time to cross} = \left(\frac{1}{b-a} \int_a^b \frac{1}{v} \cdot dv \right) \times L$$

Answer

$$\begin{aligned} &= \frac{\ln(b/a) \times L}{b-a} \\ &= \frac{0.847 \times 84}{4} \\ &= 17.787 \text{ seconds} \end{aligned}$$

The above result is closer to the simulation answer.

$$\begin{aligned} \textcircled{b} \quad L &= \lambda W \\ &= 3 \times 17.787 \\ &= 53.361 \end{aligned}$$

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