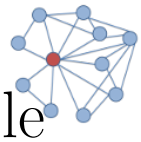
The exponential random variable



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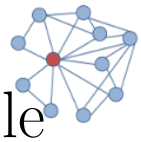
- The video discusses how to model the process of waiting for a random event to occur using the theory of Markov chains. Draw a transition graph for this random process.

- Write out the jump rate matrix that should be used within the Kolmogorov equation in order to construct this particular random model.

- The amount of time that we have to wait for the event to occur for is a random variable, T. Explain how $P(T > t)$ can be derived starting from the Kolmogorov equation.

- The random variable that is described in this video (the one I called T in the previous question) is known as the exponential random variable. Write out expressions for the cumulative probability distribution $F_T(t)$ for this random variable and the probability density $f_T(t)$.

The exponential random variable



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- Explain what it means when we state that a random variable has no memory. Reproduce the derivation from the video that shows that the exponential random variable has this property.