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# 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  $f_T(t)$ .



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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.