0.9. Stochastic Processes

Note. In this very brief section, we define (somewhat informally) a stochastic process and mention the Poisson process.

Definition. A *stochastic process* is a family of random variables, $X = \{X(T) \mid t \in T\}$, where T is some indexing set. If the set of values assumed by the family of random variables is discrete/continuous then the stochastic process itself is *discrete/continuous*, respectively.

Note. Typical cases are to take the indexing set T of a stochastic process to be $T = \mathbb{N}$ (in which case the process has "discrete time"), or to be $T = [0, 1]$ or $T = [0, \infty)$ (in these cases the process has "continuous time"). In Allan Gut's *An Intermediate Course in Probability*, 2nd Edition (Springer, 2009), the only stochastic process considered in any detail is the Poisson process in Chapter 8.

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