PGF

Let X be a random variable. Then the **probability generating function (PGF)** of X is defined as

$$G_X(t) := \mathbb{E}[t^X].$$

Properties

- If X takes values in the nonnegative integers, then

$$G_X(t) = \sum_{k=0}^{\infty} t^k \mathbb{P}(X = k),$$

- ...and if X takes only finitely many values, then $G_X(t)$ is a polynomial.