

## Moment Generating Function

## 1 Why

TODO

## 2 Results

The moment generating function of a real-valued random variable is the function mapping real numbers to the expectation of the exponential of the product of that real number with the random variable.

## 2.1 Notation

Let  $(X, \mathcal{A}, \mu)$  be a probability space. Let f be a real-valued random variable on X. Let R denote the real numbers. For each  $t \in R$ , denote by tf the function  $x \mapsto tf(x)$ . Similarly, denote by  $e^{tf}$  the function  $x \mapsto e^{tf(x)}$ .

Denote the moment generating function of f by  $m_f: R \to R$ . We defined it by

$$m_f(t) = \mathbf{E}(e^{tf}).$$