

**Definition 0.0.1** (characteristic function, mgf).

- The **characteristic function** of a r.v.  $X$  is given by  $\Phi_X(t) = \mathbb{E}[e^{itX}]$ .
- The **moment generating function** of a r.v.  $X$  is given by  $M_X(t) = \mathbb{E}[e^{tX}]$ .