

Exercise 5 for April 18

Exercise. Let X be a real-valued random variable. Assume that for fixed $T > 0, c > 0, \beta > 2$ we have

$$\mathbb{P}(X \in [u, u + T]) \underset{u \rightarrow \infty}{\sim} \frac{c}{u^{1+\beta}}.$$

Show that

$$\mathbb{P}(X \geq u) \underset{u \rightarrow \infty}{\sim} \frac{c}{\beta T} \frac{1}{u^\beta}.$$