

Homework 2

1. (40 points) Let $S_n = \sum_{k=1}^n X_k$, where X_k are independent random variables with sample space $\{0\} \cup \mathbb{N}$ and each X_k has the following property:

$$\Pr[X_k = j] \leq 2^{-j}, \text{ for } j \in \mathbb{N}$$

State and prove an exponentially-decaying concentration bound on $\Pr[S_n - \mathbb{E}[S_n] \geq nt]$.