

Homework Martingales

Exercises

(a)* Let $(S_n; n \geq 0)$ be simple random walk. Show that the following are martingales:

(i) S_n , if the walk is symmetric.

(ii) $S_n - n(p - q)$, in any case.

(iii) $(q/p)^{S_n}$.

(iv) $S_n^2 - 2\mu n S_n + (n\mu)^2 - n\sigma^2$, where $\mu = p - q$, $\sigma^2 = 1 - \mu^2$.