TMA4285 Time series models
Exercise 2, autumn 2015

Problem 1. Let $Z_1, Z_2, \ldots$ be a stochastic process defined by

$$Z_t = \sum_{j=1}^{t} a_j,$$

where $a_1, a_2, \ldots$ are independent identically distributed stochastic variables with $a_j \sim \mathrm{N}(0, \sigma^2)$. Is $\{Z_t, t = 1, 2 \ldots\}$ a second order weakly stationary process? Find the mean and autocorrelation functions of $\{Z_t, t = 1, 2, \ldots\}$.

Problem 2. Find the autocorrelation function of the stochastic process defined by

$$Z_t = -1.7 + a_t - 0.6a_{t-1} + 0.3a_{t-2},$$

where the a_j's are independent identically distributed stochastic variables with $a_j \sim \mathrm{N}(0, \sigma^2)$.

Problem 3. Problem 2.6 in Wei (2006).

Problem 4. Problem 2.7 in Wei (2006).