TS Module 5: Stationary processes HW

(The attached PDF file has better formatting.)

Homework assignment: general linear process

A time series has the form $Y_t = \epsilon_t + \phi \times \epsilon_{t-1} - \phi^2 \times \epsilon_{t-2} + \phi^3 \times \epsilon_{t-3} - \ldots$

The plus and minus signs alternate. $\phi = 0.2$ and $\sigma^2_e = 9$.

A. What is γ_0, the variance of Y_t? Show the derivation.
B. What is γ_1, the covariance of Y_t and Y_{t-1}? Show the derivation.
C. What is ρ_2, the correlation of Y_t and Y_{t-2}? Show the derivation.

(Show the algebra for the derivations. One or two lines is sufficient for each part.)