

EXERCISE ON STOCHASTIC PROCESS DEFINITIONS, MA PROCESSES

- (1) $y_t = \sin(.5\pi(t + k))$ for all integer t . k randomly distributed with equal probabilities on $\{1, 2, 3, 4\}$. Is y_t a stationary process? What is $E[y_t]$? What is $E[y_t y_{t-s}]$ as a function of t, s ? What is the innovation variance in y_t ?
- (2) $y_t = \varepsilon_t + 2\varepsilon_{t-1} + .64\varepsilon_{t-2}$. ε_t is i.i.d. $N(0, 1)$. Find the ACF of y . Show that ε_t is not the innovation in y . Find a finite linear combination of y_{t-s} for $s \geq 1$ that predicts y_t with forecast error variance no more than 25% worse than the actual innovation variance.
- (3) $y_t = \varepsilon_t + 1.5\varepsilon_{t-1} + .5\varepsilon_{t-2}$. ε_t is i.i.d. $N(0, 1)$. Find the ACF of y . Show that ε_t is the innovation in y . Find a finite linear combination of y_{t-s} for $s \geq 1$ that predicts y_t with forecast error variance no more than 25% worse than the actual innovation variance.

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