Tentamen Time Series Econometrics
27.03.2012

1. LLM (35 punten)
   a. Wat is q? Waar staat dit voor? Wat is signal-to-noise ratio?
   b. Laat zien LLM is MA(1).
   c. Restricties voor MA(1).
   d. Kalman Filter
      i. Waar staan alle variabelen voor? Beschrijf de variabelen: *vt; at; Ft;Pt;Kt*
      ii. Initial values for a1, P1.
   e. Backward Smoothing. Derive backward smoothing.
   f. What to do with missing observations? Filter and Smoother.

2. Importance Sampling (30 punten)
   Regression model, coefficients varying over time. Coefficients: Random Walk. Xt is a vector of covariates??
   a. Give details for iterative procedure to compute the mode p(beta|Yn;Psi). Psi is vector of unknown coefficients and also known.
   b. Give details for evaluating loglikelihood via importance sampling.

3. Frequency domain / Long-memory model (35 punten)
   yt = psi_t + eps_t
   psi_t = alpha cos (lambda * t) + beta sin (lambda * t).
   eps_t+1 = phi eps_t + eta_t
   eta_t ~ NID(0,sigma_eta^2)
   a. What is frequency, amplitude, phase, shift of this model?
   b. Is psi_t stationary? And why?
   c. Do amplitude and phase vary over time?
   d. Give the power spectrum of psi_t.
   e. Give the power spectrum of y_t.
   f. Discuss loglikelihood (y_t and psi_t). Is it exact?
      Long-memory gedeelte
   g. ARFIMA opgeschreven als 1-L (in lag operators).
   h. Discuss Stationarity.
   i. Give power spectrum (derive).
   j. Give autocovariance and autocorrelation functions.
   k. Discuss exact maximum likelihood.
   l. Give State Space Estimation.