MathFinance 346/Stat 391. Winter 2005.
Homework 3. Due Wed 1/26.

All exercises use the notation in Schweizer's (1992) paper. Except in problem 5, you can assume that the short rate $r = 0$.

1. If the risk neutral measure coincides with the "minimal martingale measure" $\hat{P}$, find the market price of risk in the following P-Brownian motions: B_t, ϵ_t, ξ_t, and N_t.

2. Find the sensitivity of the hedging strategy to the initial value: $\partial \theta_t^* / \partial L$. (Give as explicit an expression as you can).

3. Assume that all the coefficients (μ, σ, m, v and ρ) are nonrandom and constant. Find, as explicitly as you can, the hedging strategy for a European call on S_T with strike K.

4. Assume that all the coefficients (μ, σ, m, v and ρ) are nonrandom and constant. Find, as explicitly as you can, the value L that minimizes
$$\min_{\theta \in \Theta} E(\Pi + L - G_T(\theta))^2.$$

Give L for the European call on S_T with strike K.

5. Assume that the short term interest rate is non-zero. Show how to adapt Schewizer's results to this case. Discuss what conditions need to be imposed on the interest rate.