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: $B_t$, $\epsilon_t$, $\xi_t$, 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 ($\mu$, $\sigma$, $m$, $v$ and $\rho$) 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 ($\mu$, $\sigma$, $m$, $v$ and $\rho$) 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.