PHYSICS 210B : NONEQUILIBRIUM STATISTICAL PHYSICS
HW ASSIGNMENT #4

(1) Evaluate, for general α, the averages of the following stochastic integrals:

$$\int_0^t dW(s)\, W(s)\, s \qquad , \qquad \int_0^t dW(s)\, W^3(s)\, e^{-\lambda s} \qquad , \qquad \int_0^t dW(s)\, W^{2k+1}(s) \quad .$$

(2) Derive Eqn. 3.107 of the lecture notes.

(3) For the colored noise example in §3.5.3 of the notes, compute numerically $\hat{Y}(\omega)$ and plot your results as a function of $\omega - \nu$. Set $\lambda \equiv 1$ and plot your results for a representative set of different values of the parameter β.