[nex70] **Critically damped ballistic galvanometer.**

The response of a critically damped ballistic galvanometer to a current pulse at $t = 0$ is $\Psi(t) = cte^{-\gamma t}$. Consider the situation where the galvanometer experiences a steady stream of independent random current pulses, $X(t) = \sum_k \Psi(t - t_k)$, where the t_k are distributed randomly with an average rate n of occurrences.

(a) Find the average displacement $\langle X \rangle$ of the galvanometer.

(b) Find the autocorrelation function for the displacement of the galvanometer, $\langle\langle X(t)X(0)\rangle\rangle$, and the associated spectral density $\Phi_{XX}(\omega)$.