Power Spectra 1-14 Homework

1. Let $x_0(t)$ be a Poisson process with rate λ.

   Calculate the power spectrum $P_X(\omega)$ of $X = X_0 - \lambda$.

   [λ is subtracted so that $\langle X(t) \rangle = 0$.]

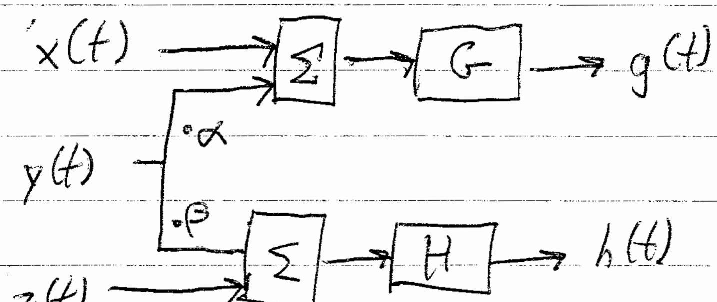
   Calculate the bispectrum $B_X(\omega_1, \omega_2)$

2. Shot noise:

   Let $y_0(t)$ = the result of passing the above $X_0(t)$ through a linear filter G, with impulse-response $G(t)$.

   Find the P.S. of $y = y_0(t) - \langle y_0(t) \rangle$.

3. Connectivity: Given independent noises $x(t)$, $y(t)$, $z(t)$:



[$y(t)$ is multiplied by α, prior to contributing to G's input; $y(t)$ is multiplied by β prior to contributing to H's input]

$$\boxed{\text{Find } P_G,\ P_H,\ C_{GH};\ \text{assuming } P_X,\ P_Y,\ P_Z \text{ known.}}$$