

Homework 6

Due in class on Tuesday Oct 27, 2011

1. Problem 11.1-4
2. Problem 11.1-8
3. Problem 11.2-1
4. An extended source of area 1 cm^2 emits light with mean frequency $\omega = 10^5 \text{ rad/s}$. Design an optical setup that will filter the field and generate a coherence area of 1 mm at a certain plane.
5. Fields from two sources of Gaussian spectra, $S_1(\omega) = e^{-\frac{(\omega-\omega_1)^2}{2\Delta\omega_1^2}}$ and $S_2(\omega) = e^{-\frac{(\omega-\omega_2)^2}{2\Delta\omega_2^2}}$, are overlapped and used in LCI/OCT experiments ($\omega_{1,2}$ are the respective mean frequencies and $\Delta\omega_{1,2}$ the bandwidths). Calculate the autocorrelation function of this composite field. Comment on the depth resolution in OCT provided by this composite field vs. that of the individual sources.