BioE311
Notes on PSet1

In problem 2c, note that since ϕ^* is a constant, $\frac{d\delta\phi}{dT} = \frac{d\phi}{dT} = f(\phi)$.

In problem 3d, you can assume that the value of x at all times $-\tau < t < 0$ is constant (you can arbitrarily choose this constant).

In problem 4a, we ask you to calculate the circular average and plot the circular variance. Recall the equation for circular variance:

$$Z = \frac{1}{N}\sum_j e^{i\phi_j} = |Z|e^{i\theta}$$

The phase of each individual oscillator in the problem set is represented by θ_i. Note that this notation (confusingly) differs from the equation above, where ϕ_j corresponds to the individual oscillators. Once you calculate Z, you will need to find the magnitude of Z to plot it since Z exists in the complex plane.

The circular average $\langle\theta\rangle$ in the problems set is the θ on the right hand side of the equation above. This value is the average of all the phases of the individual oscillators. You can use the equation above to calculate the circular average, or you can sum up your ϕ_j and divide by N, where N is the total number of oscillators.

In problem 4d part 2, the i in $\omega_i = 1 - exp(-i/\lambda)$ is the index i, not the imaginary i.