C-21-1 Models in Applied Mathematics
Fall 1996
Prof. Hermann Riecke

First Part of Problem Set 1 October 3

1. Calculate systematically the solutions to the equation describing the forced frictionless harmonic oscillator. In the non-resonant as well as the resonant case, use variation of parameters to find the solution that satisfies the initial conditions $x(t=0)=0$ and $\dot{x}(t=0)=1$. In the almost resonant case ($\omega-\omega_0$ small) show that the general solution exhibits 'beating', i.e. the amplitude of the fast oscillations exhibit a slow variation on the time scale $O(1/(\omega-\omega_0))$.