**HW 8 Problem 2 Solution Sketch – Cooperative Localization problem**

In the following plots, the initial state conditions stated in the problem are perturbed by the vector

```
perturb_x0 = [0; 1; 0; 0; 0; 0.1];
```

with nominal control inputs, no process noise inputs, and with no measurement noise outputs simulated.

Plot of states vs. time for full nonlinear dynamics (integrated via ode45) for 100 time steps, followed by plot of resulting measurements according to full nonlinear measurement model.
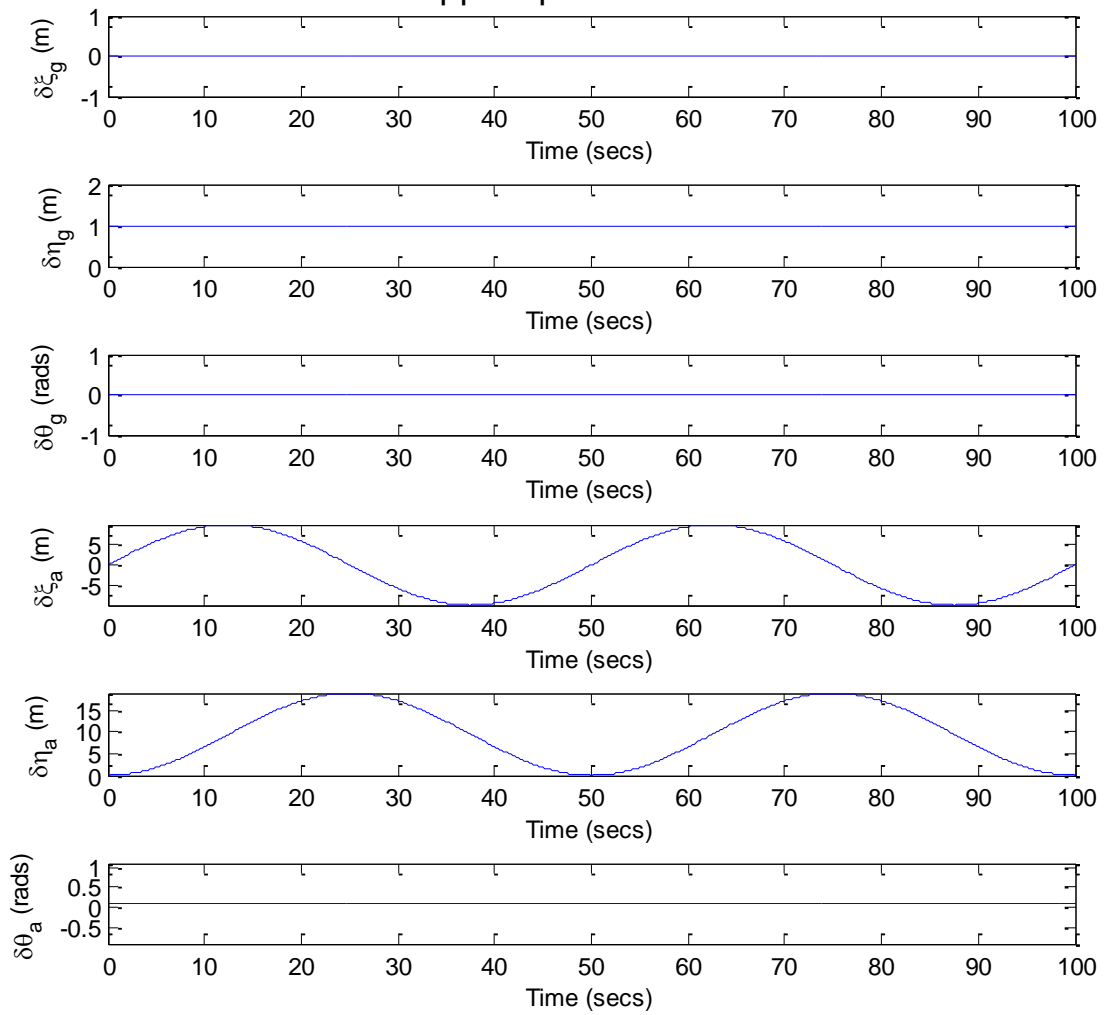
Full Nonlinear Model Data Simulation
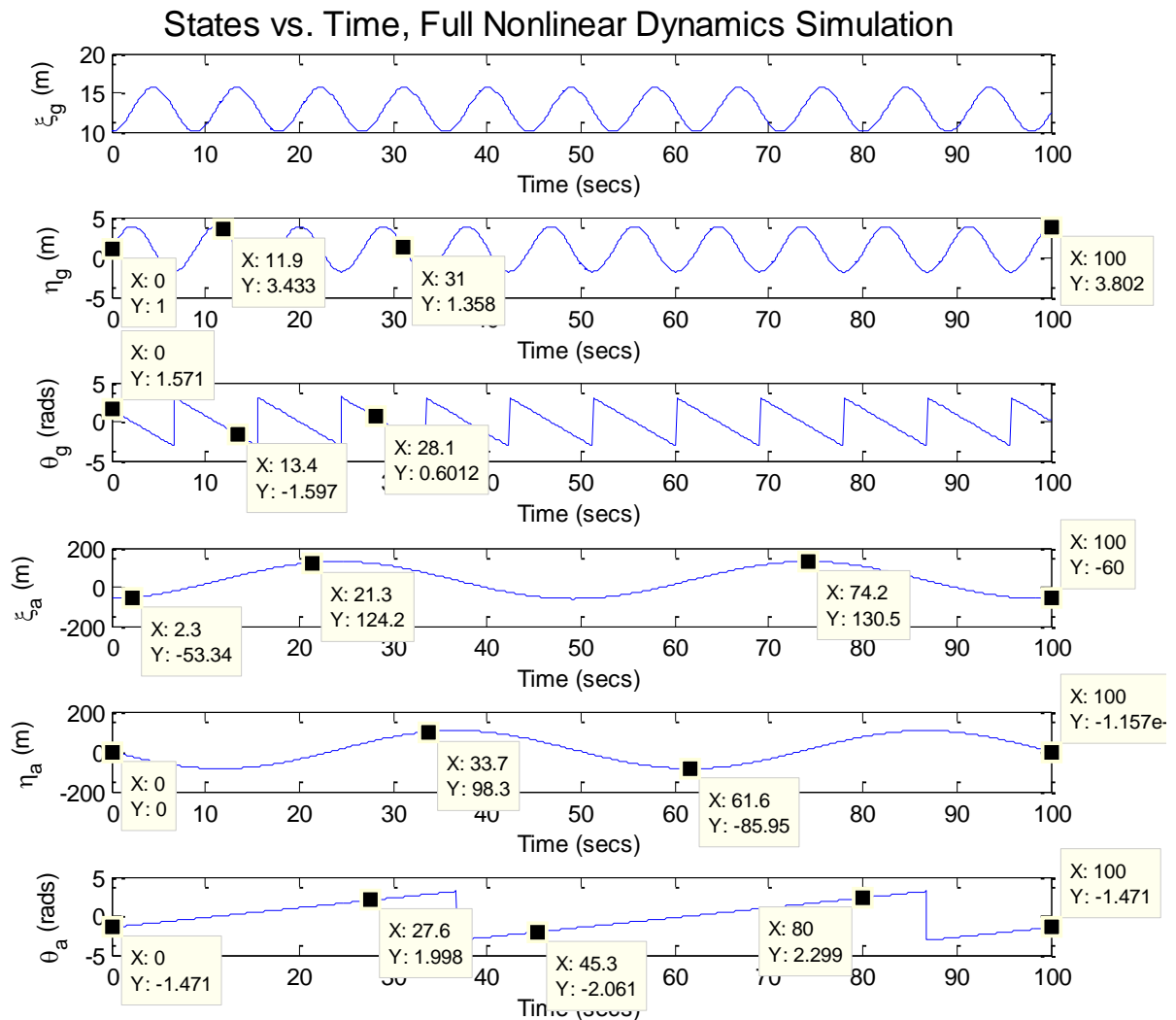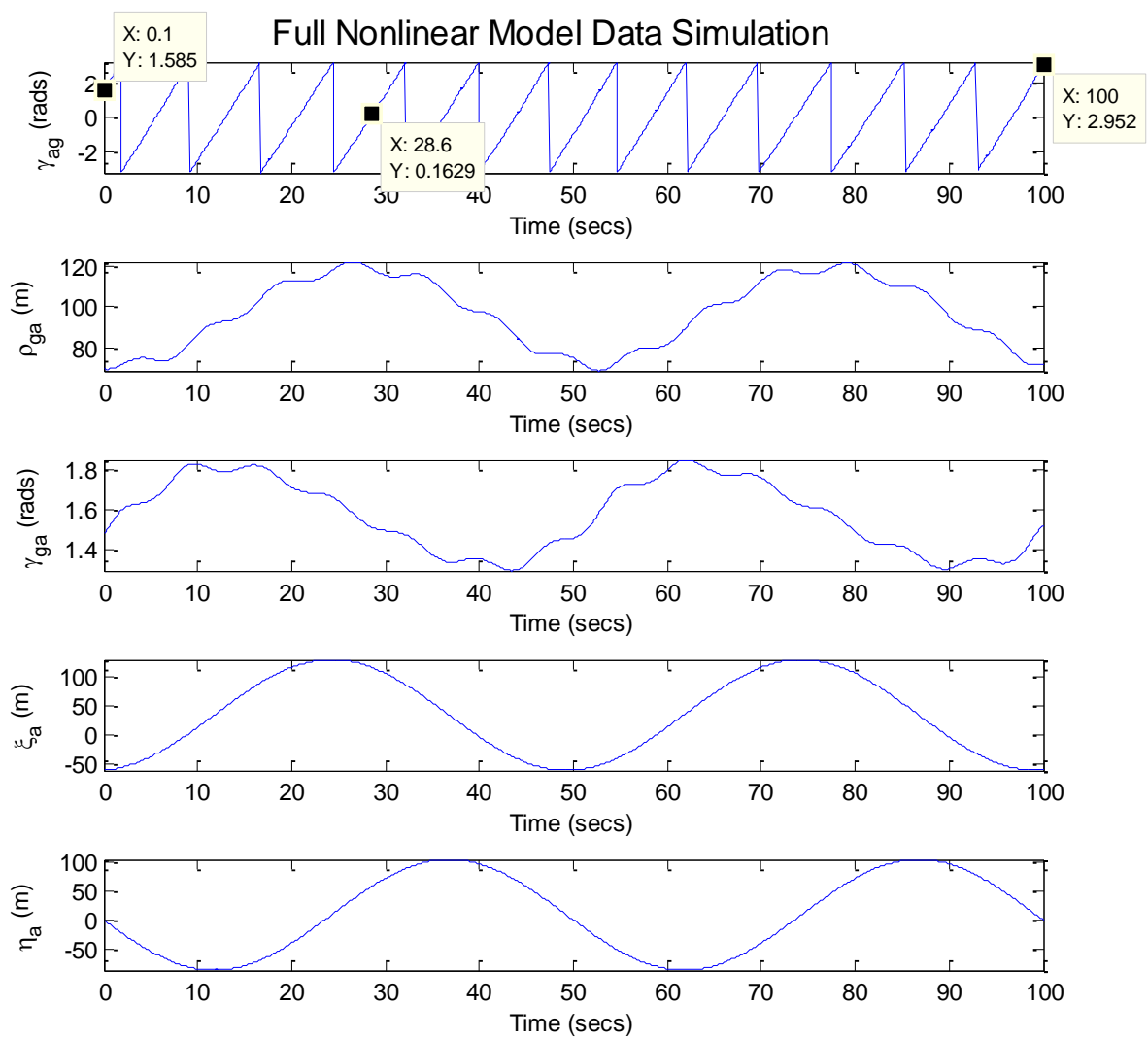
Next is a plot of total states vs. time using linearized dynamics model (linearized about nominal noise-free state trajectory), followed by plot of corresponding state perturbations (evolving according to linearized dynamics near nominal trajectory) and plot of measurements according to linearized measurement model (which accounts for nominal measurements + linearized perturbations in nominal measurements):

States vs. Time, Linearized Approximate Dynamics Simulation
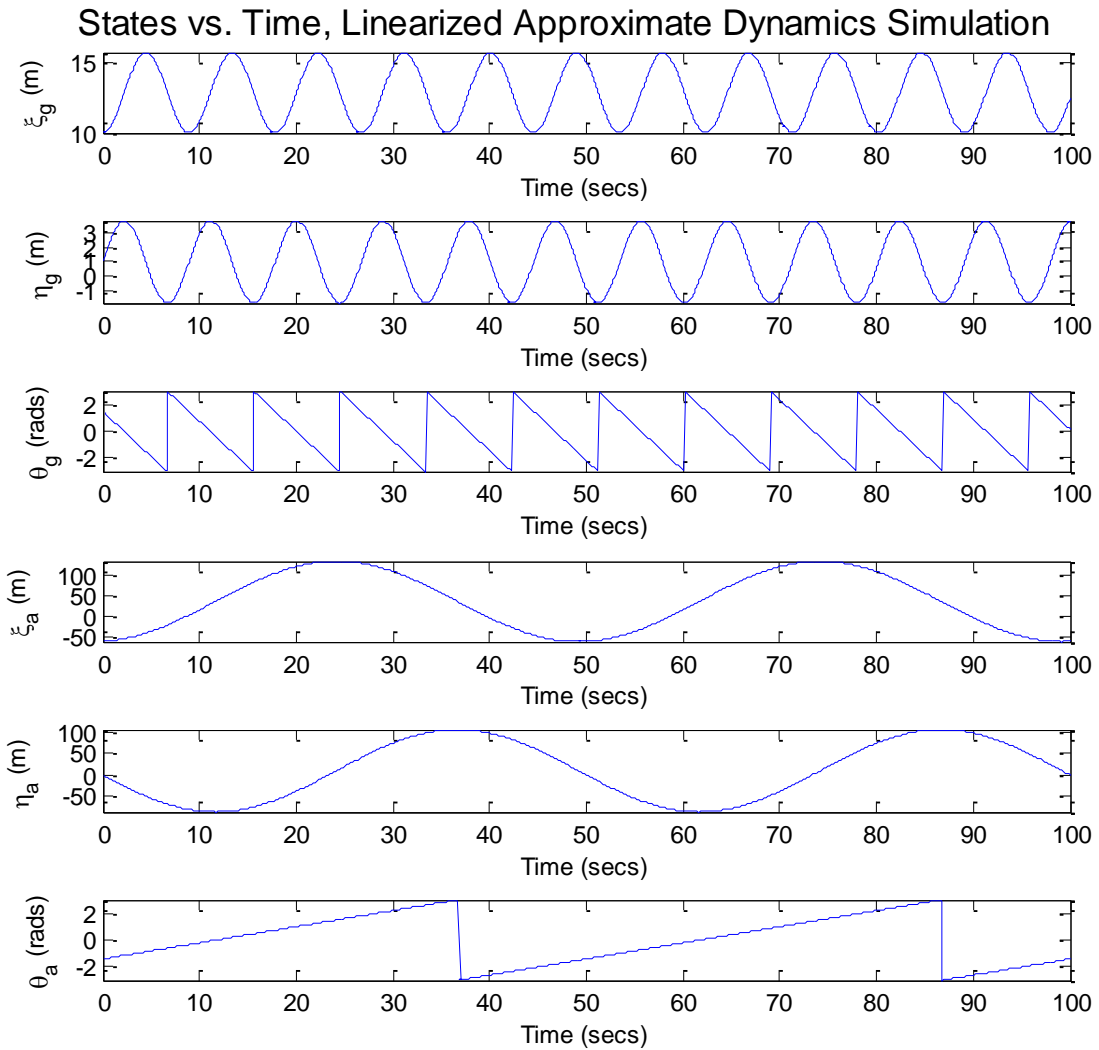
Linearized approx perturbations vs. Time

Approximate Linearized Model Data Simulation