

**CECS 622**  
**Simulation and Modeling of Discrete Engineering Systems**

Assignment # 1

- [ 1] Search for alternative definitions of “modeling” and “simulation” and report with your comments.
- [ 2] Find a published “simulation” research article or project report and discuss whether it follows the “simulation steps” discussed.
- [ 3] Write a Simulation program and test it for a 3-Dimensional space pursuit of two spaceships each equipped with a laser beam weapon that can destroy its target if it is within a cylindrical angle of  $\alpha$  degrees and a distance of  $\beta$ . Do not assume a pure pursuit, but make any necessary assumptions for smart spaceship commanders.

Some sort of graphic (character graphic is allowed) output is required in addition to a summary report discussing your results.

**Hint:**

Equations for a 2-D pursuit of a cat tracking a mouse are given as follows:

- The distance between the cat and the mouse at time  $t$  is always given as:

$$Dist(t) = \sqrt{(Y_{mouse}(t) - Y_{cat}(t))^2 + (X_{mouse}(t) - X_{cat}(t))^2}$$

- The angle  $\theta$  of the line between the cat and the mouse at time  $t$  is given by:

$$\sin \theta = \frac{Y_{mouse}(t) - Y_{cat}(t)}{Dist(t)}$$

$$\cos \theta = \frac{X_{mouse}(t) - X_{cat}(t)}{Dist(t)}$$