

Project 2: Radar control in 3-dimensional space

Description:

Design a target tracking system for a radar in 3-dimensional space. The radar antenna can change its azimuth and elevation angles using two servo motors. The moment of inertia for azimuth and elevation angle controlling motor is 500 kgm^2 and 600 kgm^2 . You have to design the radar system that will track the target automatically.

Deliverables:

1. A mathematical model of radar and target system.
2. A control system design.
3. Demonstration using Simulink and corresponding 3-dimensional animation.

Part 2: Controller design and demonstration

Deadline: 19th December 2020

Assume the target is taking a horizontal flight at 10km altitude in a straight line at an arbitrary direction with a constant velocity of 50m/s. Also assume that the tracking system can estimate the position of the target (x, y, z coordinates) accurately. Design a controller which can steer the antenna such that the antenna maintains the Line of Sight with the target.

Requirements:

1. Functioning simulink model
2. 3 minutes of group meetings
3. A report describing the methodology, derivation, simulation results
4. An animation of the functioning of the antenna and the target
5. A presentation

Ps. As a group, you may ask for 2 meetings with the instructor for understanding and clarification of the design requirements

Upload Simulink model, minutes of meeting and the report in the google class-room using a single zip file. File name should be: **ECE533project_group#no.zip**. Note that the report must be in pdf format and **photographs of handwritten notes will not be accepted as a valid report. The submission will not be considered for evaluation if the naming format or prescribed report format is not followed.**