**AMERICAN INTERNATIONAL UNIVERSITY BANGLADESH**

DEPARTMENT OF EEE/CoE, FACULTY OF ENGINEERING

**CONTROL SYSTEM**

**FINAL ASSIGNMENT**

**Antenna azimuth position control system:**

The antenna azimuth control system currently available on the market is described as a

servo controlled antenna through the use of gears and feedback potentiometers. The current

design lacks any sort of compensator controller that would provide stability control. Our team

must analyze the current configuration and determine the stability.

|  |  |
| --- | --- |
|  |  |

**Figure 1:** Antenna azimuth position control system. (a) System concept. (b) Detailed layout.

(c) Schematic block diagram. (d) Functional block diagram.

|  |
| --- |
| (a)    (b) |

**Figure 2:** subsystems of the overall system, each with its associated transfer function. (a) Block diagram. (b)Schematic diagram.

|  |
| --- |
| **Table 1:** Schematic parameters for the system (three configuration). |

**DESIGN REQUIREMENTS:**

Find the transfer function of the five subsystems. Then, find the overall transfer function of the system. Use the given schematic parameters (See Table 1) for three configurations to model the system. Find the system stability, steady-state response, and time response. Sketch the root locus for the system. Now, design the antenna azimuth position control system for the above three configurations. Design the cascade compensations for the above three configuration to meet the following requirements: (1) 20% overshoot, (2) 1.5-second settling time, (3) static error constant, *Kv* = 12**.**

|  |
| --- |
| **Table 2:** Variables used in this system schematics and block diagram. |
|  |

|  |  |
| --- | --- |
| **1** | **2** |
| **3** |

Figure 3. Root locus for configuration 1, 2 and 3.

|  |  |
| --- | --- |
| 1 | 2 |
| 3 |

Figure 4 : Steady-state response and time response 1, 2 and 3.