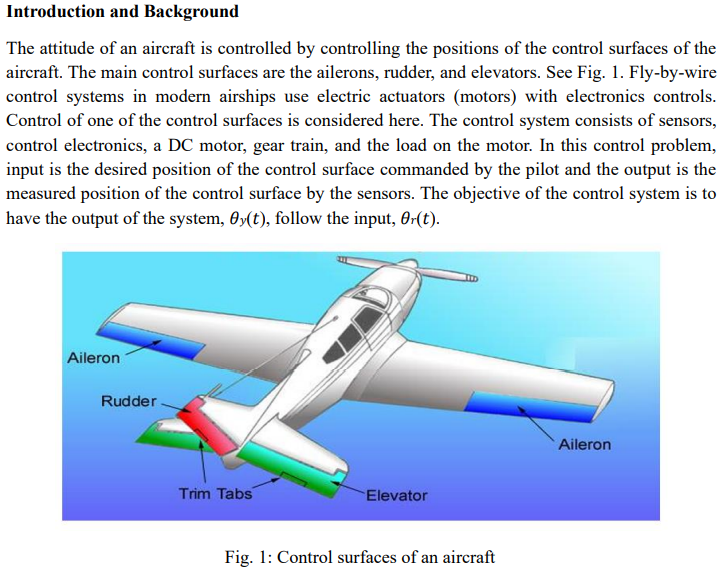
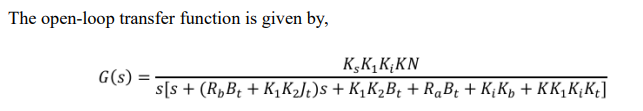
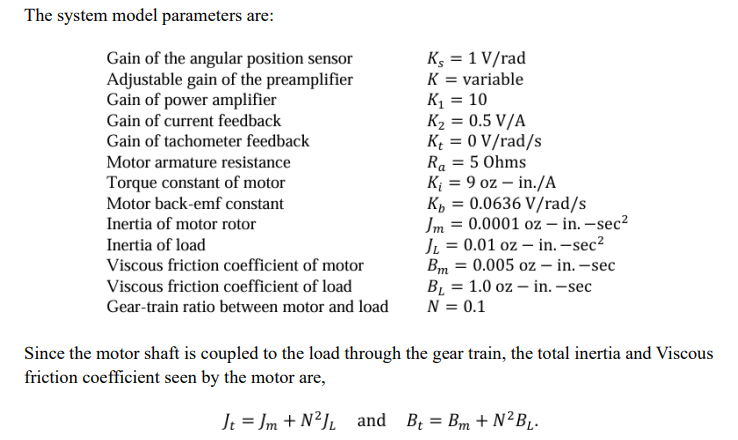
**BANDARA H.G.T.D.**

**2022/E/048**

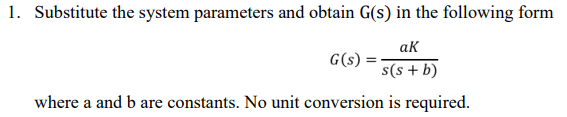
**SEMESTER 05**

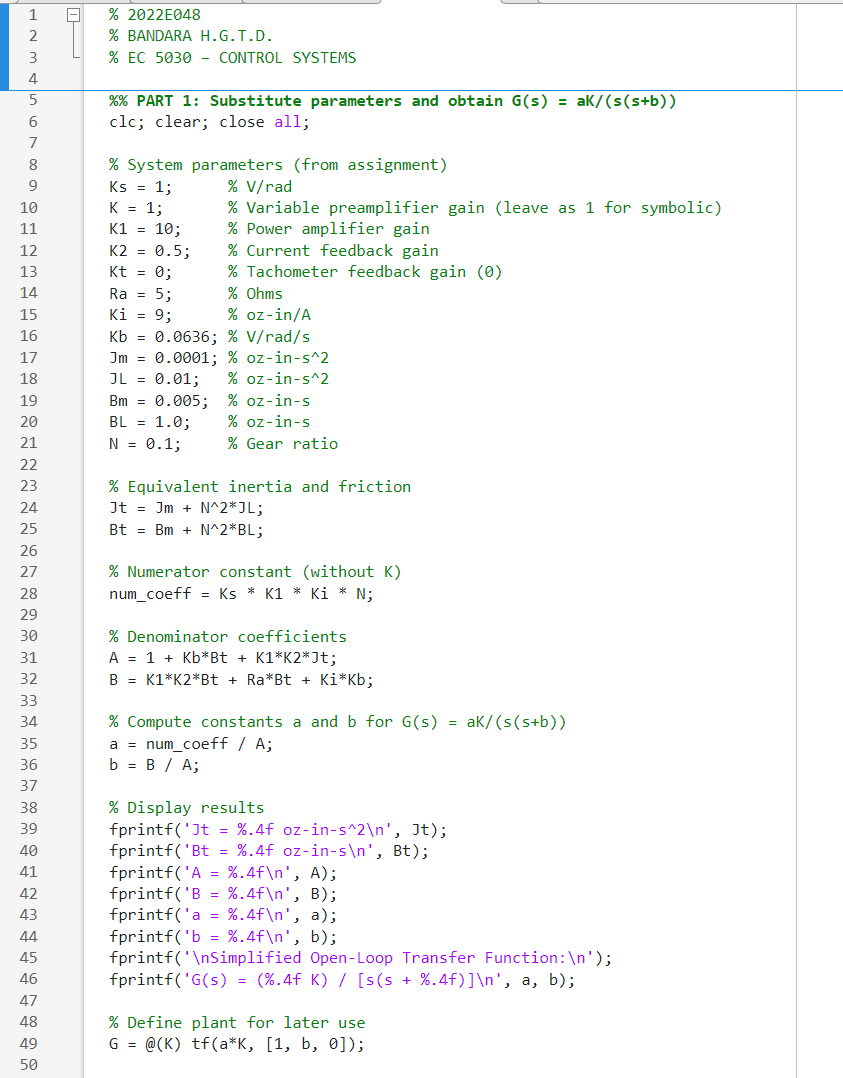
**2025/04/07**

**DESIGN AND COMPUTER SIMULATION OF A CLOSED – LOOP CONTROL SYSTEM OF ATTITUDE CONTROL OF AN AIRCRAFT**



**TASKS**





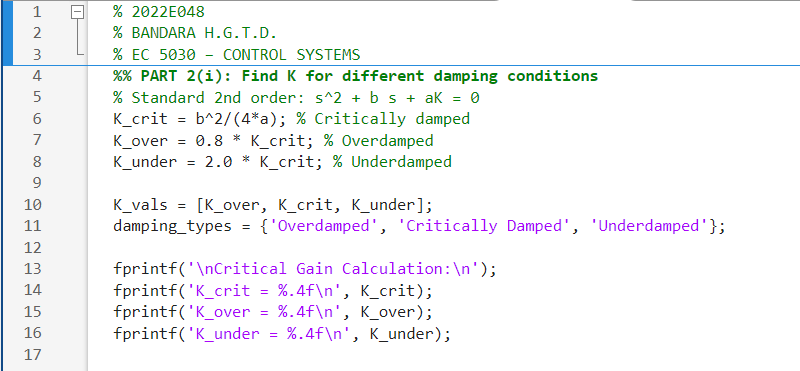
**FIGURE 01: MATLAB CODE FOR OBTAINE G(s)**

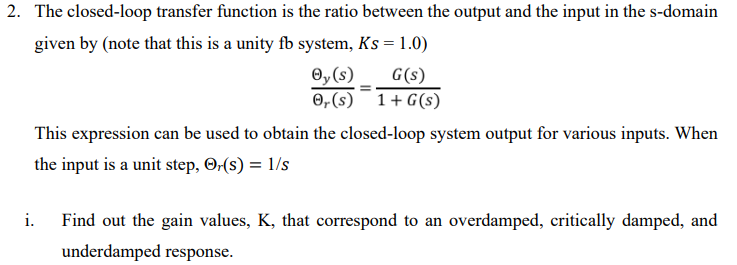
**A screenshot of a computer program

AI-generated content may be incorrect.FIGURE 02: OBTAINED MATLAB OUTPUT FOR G(S)**

**Then,**

**G(s) =**

****

****

**FIGURE 03: MATLAB CODE FOR FIND K FOR DIFFERENT DAMPING CONDITIONS**

**A number of numbers and symbols

AI-generated content may be incorrect.**

**FIGURE 04: OUTPUT**

* K =0.0116 → Overdamped
* K = 0.0145 → Critically damped
* K = 0.0289 → Underdamped

**Characteristic Equation**

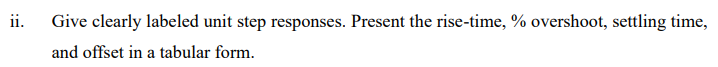
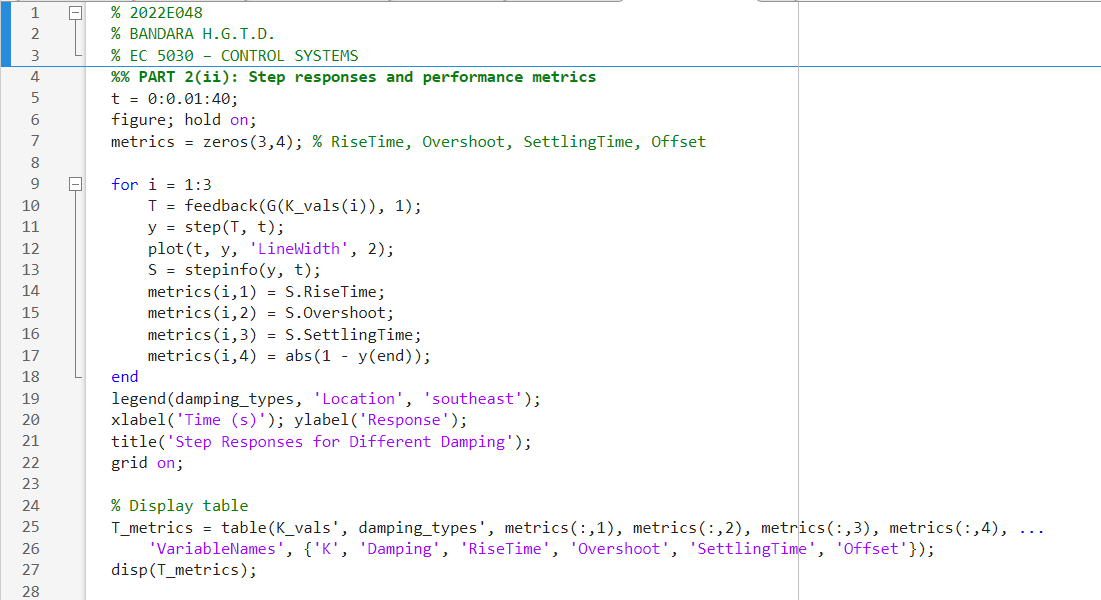
S2+0.7210S+8.9824K=0

**Damping and Gain Selection**

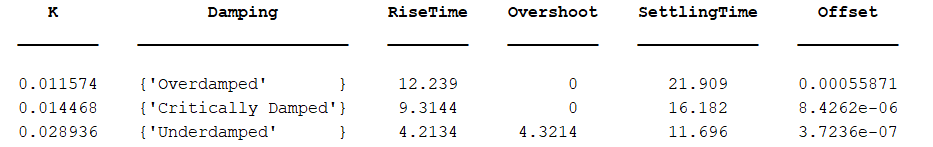
The standard second-order form is:

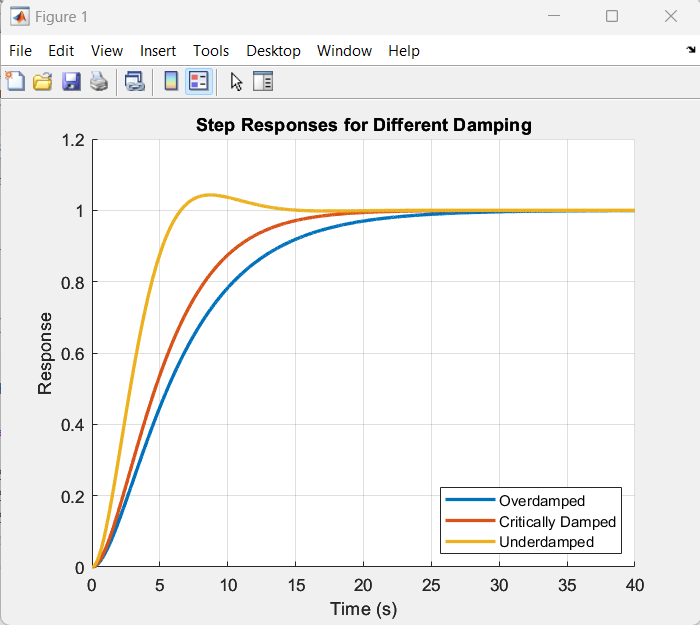
*S*2+2*ζωnS*+*ω2n*=0

2*ζωn* =0.7210, *ω2n* =8.9824*K*

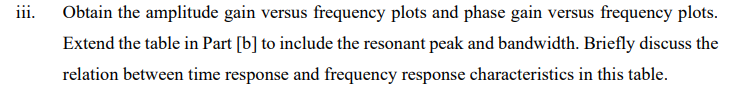
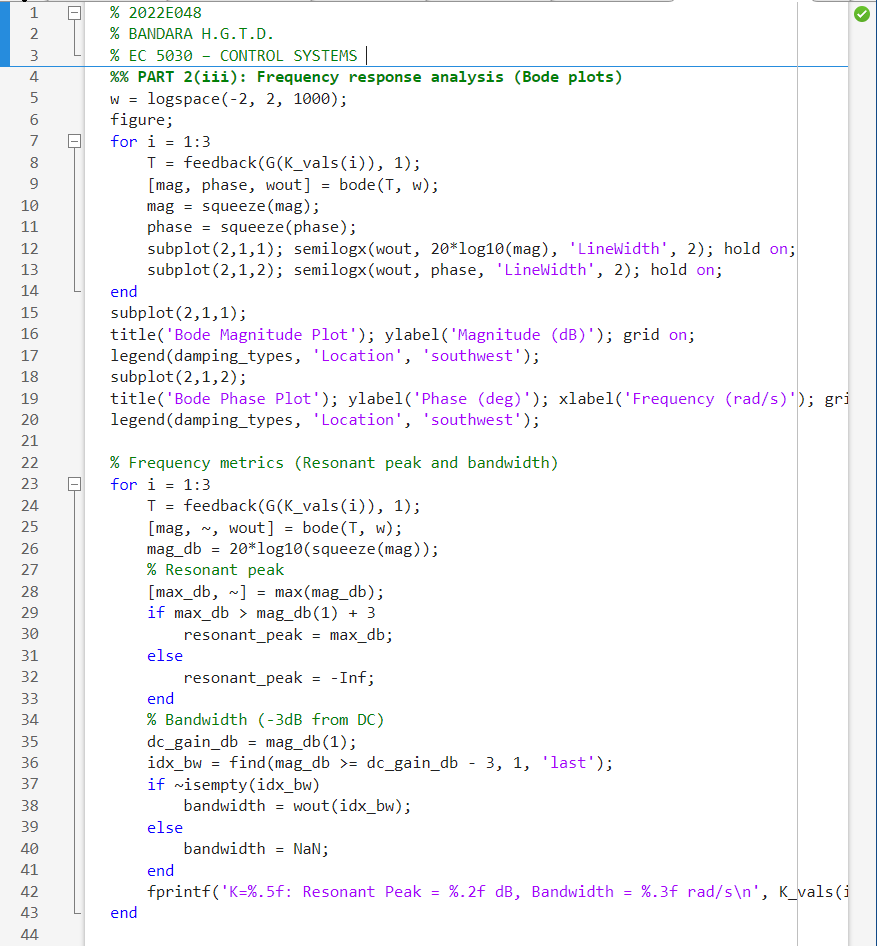


**FIGURE 04: MATLAB CODE FOR PART 2(ii)**

**FIGURE 05: OUTPUT FOR PART 2(ii)**



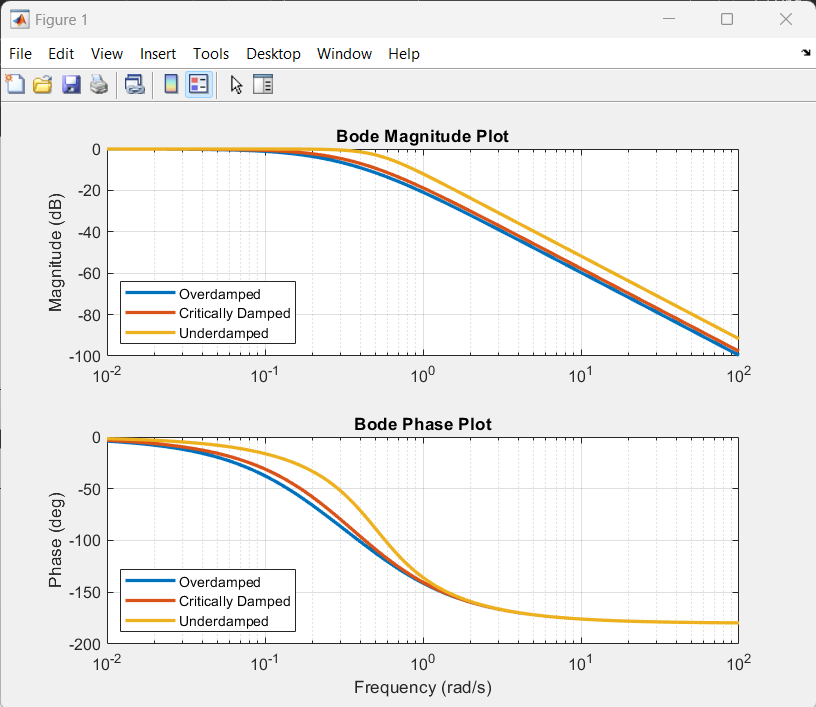
**FIGURE 06: STEP RESPONSES FOR DIFFERENT DAMPING**

**FIGURE 07: MATLAB CODE FOR PART 2(iii)**

A group of black text

AI-generated content may be incorrect.

**FIGURE 08: VALUE OF RESONANT PEAK AND BANDWIDTH**



**FIGURE 09: AMPLITUDE GAIN VERSUS FREQUENCY PLOTS AND PHASE GAIN VERSUS FREQUENCY PLOTS**