Experiment #4

Time Domain Response Analysis Using the Program MATLAB

1. Introduction

Using the progtam MATLAB, it is possible to investigate the responses of different systems to different inputs. The system can be constructed in transfer function form. Bode and Nyquist plots, root-loci can be obtained usnig the program. To construct a system in transfer function form, consider the following sample string:

```
>>s =tf('s');

>> G1=1/(s^2+2*s+1);

>>step(G1)
```

Observe the response of the system to step input

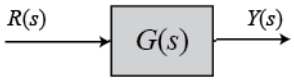
```
>>impulse(G1)
```

Observe the response of the system to step input

2. Experimantal Work

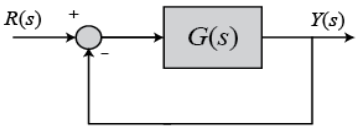
Find and rougly sketch the step and impluse responses of the following systems. If the responses are oscillatory, find their frequency of oscillation.

2.1



G(s) = 100/(s+0.1)(s+5)

2.2



G(s) = 100/(s+0.1)(s+5)

2.3

G(s) = 100/s(s+5)

3. Results and Conclusions

3.1. Regarding the responses you have obtained, comment on the relative stability of the three systems. Are the responses overdamped, critically damped, or underdamped?

3.2. What conclusions can be derived as a result of this experiment?