Simulation Assignment 1

Rami Wail Shoula, ID: *201600112*
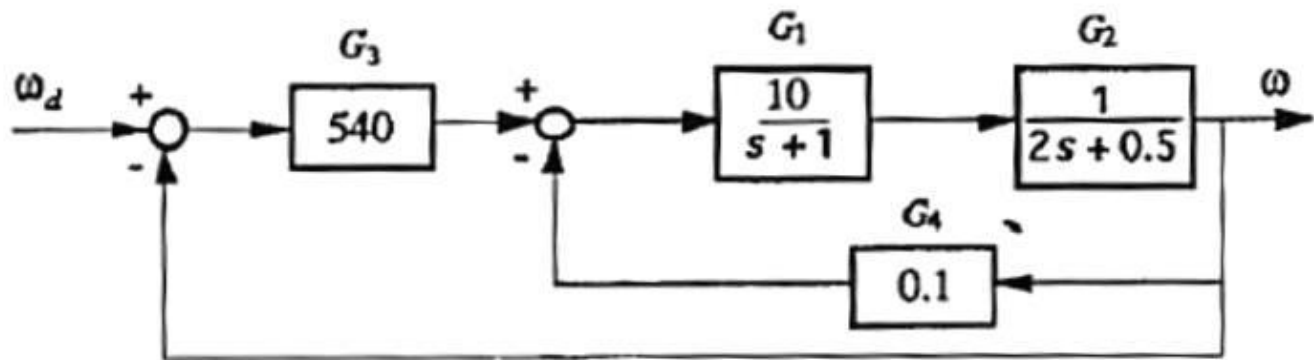Supervised by: Professor Mohamed Darweesh, Eng Bassant Ibrahim, Eng Ahmed Morsy

## Table of Contents

I. INTRODUCTION & OBJECTIVE

The objective is to obtain the transfer function of the following block diagram using MATLAB simulation software: -

II. METHOD

As shown in the block diagram, the transfer from wd to w is achieved over three phases. To simplify the simulation process, each phase is encoded separately, starting from the output (right) side. Accordingly, phase A consists of blocks G1 & G2; while phase B consists of blocks G1, G2 & G4; concluding with phase C including all blocks. (Each phase was saved as a script but was run in command window).

A. Phase A
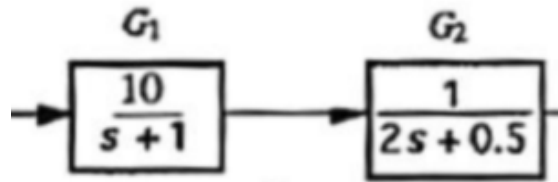
Our process is from the output (right) end, so normal series system starts with block G2 as unit 1, followed by G1 which is unit 2. Output from phase A is shown below:


```
>>
num1=[1];
den1=[2 0.5];

num2=[10];
den2=[1 1];

[numA, denA]=series(num1,den1,num2,den2);
printsys(numA,denA)

num/den =

            10
    -------------------
    2 s^2 + 2.5 s + 0.5
```
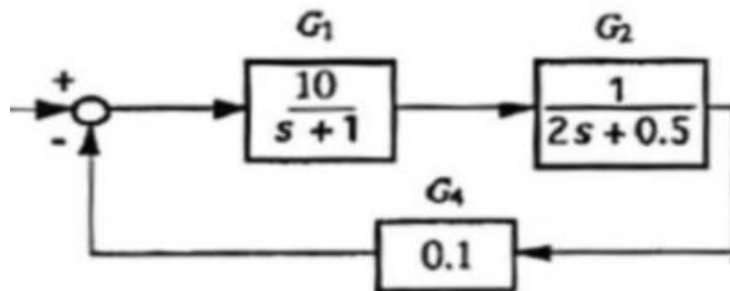
B. Phase B

Phase B consists of phase A in addition to block G4 which is unit 3. Output from phase B: -
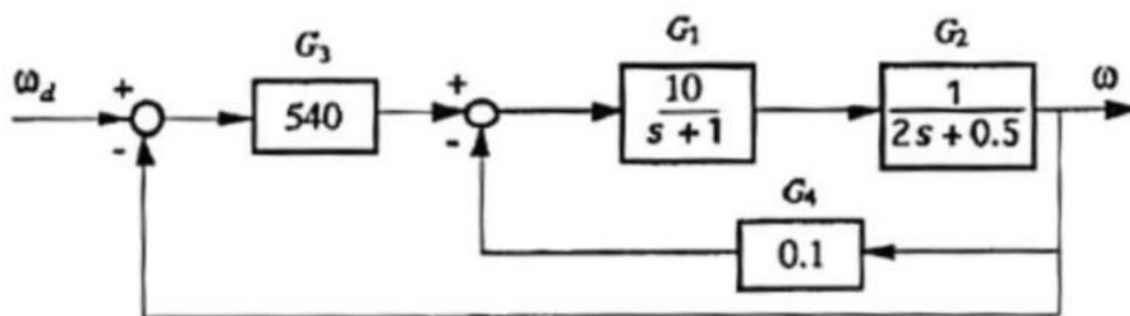
```
>>
num3=[0.1];
den3=[1];

[numB,denB]=feedback(numA,denA,num3,den3);
printsys(numB,denB)

num/den =

              10
       -------------------
       2 s^2 + 2.5 s + 1.5
fx >>
```

C. Phase C

Phase C simply consists of previous two phases in addition to series G3 block or unit 4. Output of phase:

```
>>
num4=[540];
den4=[1];

[numC,denC]=series(numB,denB,num4,den4);
printsys(numC,denC)

num/den =

             5400
       -------------------
       2 s^2 + 2.5 s + 1.5
fx >>
```

Employing the closed loop in this phase:

```
>>
[numD,denD]=cloop(numC,denC,-1);
printsys(numD,denD)

num/den =

            5400
   ----------------------
    2 s^2 + 2.5 s + 5401.5
>>
```