**LAB # 13(Open Ended)**

**OBJECTIVE:** Find the step response of the given closed loop transfer function with a derivative controller for given values of Kd = 5, 7, 20, assume Kp=Ki=6 and compare the results in terms of Rise Time, Overshoot, Settling Time & Steady State Error.

G1(s) = G2(s)=

**SOFTWARE REQUIRED:** MATLAB

**METHODOLOGY:**

**For G1(s):**

kd=1

n=[kd]

d=[1 20 50 10+kd]

g=tf(n,d)

step(g)

hold on

kd=3

n=[kd]

d=[1 20 50 10+kd]

g=tf(n,d)

step(g)

hold on

kd=5

n=[kd]

d=[1 20 50 10+kd]

g=tf(n,d)

step(g)

**For G2(s):**

kp=6

ki=6

kd=5

n=[kd kp ki]

d=[1 10+kd 20+kp ki]

g=tf(n,d)

step(g)

stepinfo(g)

hold on

kp=6

ki=6

kd=7

n=[kd kp ki]

d=[1 10+kd 20+kp ki]

g=tf(n,d)

step(g)

stepinfo(g)

hold on

kp=6

ki=6

kd=20

n=[kd kp ki]

d=[1 10+kd 20+kp ki]

g=tf(n,d)

step(g)

stepinfo(g)

**OBSERVATIONS:**

**FOR G1(s):**

kd = 1

n = 1

d = 1 20 50 11

g =

1

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s^3 + 20 s^2 + 50 s + 11

Continuous-time transfer function.

kd = 3

n = 3

d = 1 20 50 13

g =

3

------------------------

s^3 + 20 s^2 + 50 s + 13

Continuous-time transfer function.

kd = 5

n = 5

d = 1 20 50 15

g =

5

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s^3 + 20 s^2 + 50 s + 15

Continuous-time transfer function.

**FOR G2(s):**

RiseTime: 8.2688

SettlingTime: 14.1881

SettlingMin: 0.9002

SettlingMax: 0.9985

Overshoot: 0

Undershoot: 0

Peak: 0.9985

PeakTime: 23.5808

**RESULTS & DISCUSSIONS:**

**FOR G1(s): FOR G2(s):**

**CONCLUSIONS:**

Through this we have check out the over shoot time , setting time and other parameters using matlab.