CONTROL SYSTEMS (UE21EC241B) PROJECT

TOPIC:EFFECT OF FEEDBACK ON A SYSTEM

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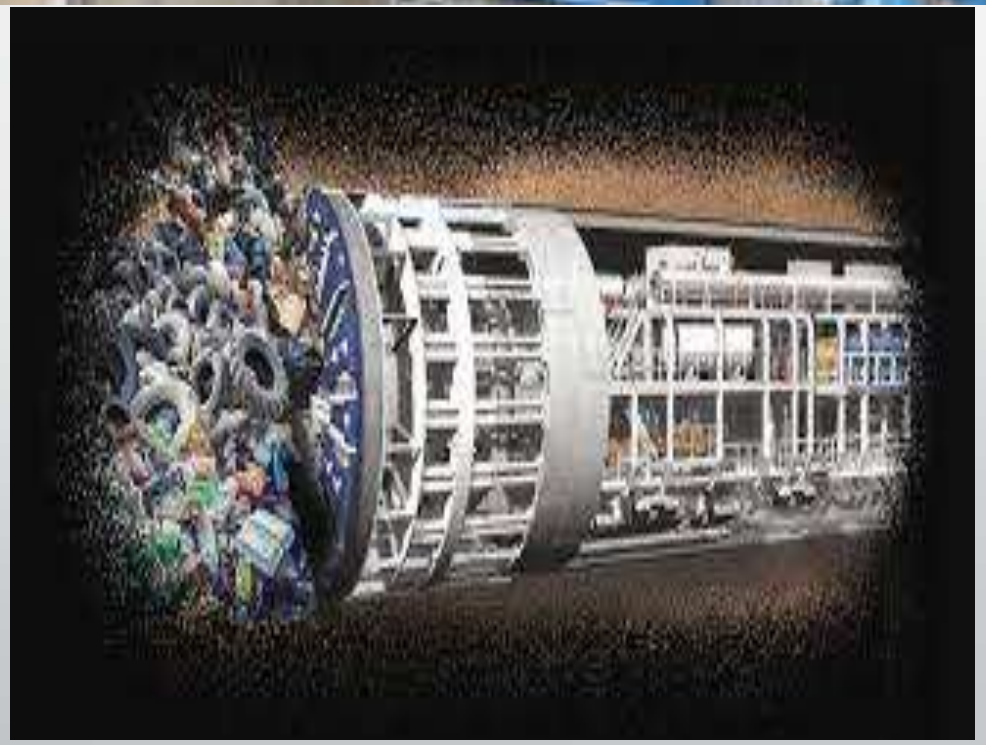
SECTION: A

OBJECTIVE:To deduce the effect of feedback on a system

- EXAMPLE:A boring machine used in industries and construction.
- The boring machines that have been used for the “Namma Metro” construction: The tunnel boring machines (TBMs)
- The tunnel boring machines (TBMs) in Namma Metro's subterranean fleet bear names inspired by nature and mythology: Avni (earth), Lavi (lion), Urja (strength), Vindhya (mountain), Rudra (name of Lord Shiva), Varada (other name of Lord Ganesha, also the first machine bought), Tunga (river), Vamika (a name of Goddess

Why we use laser guidance system in boring machines?

- In **NAMMA METRO** construction, the machines operating from both ends of a tunnel bore toward the middle. To link up accurately in the middle of the tunnel, a laser guidance system keeps the machines precisely aligned.



- **EX-1)Open-loop response**: Consider the following figure where the boring machine is represented by the transfer function G(s)=s(s +p) ,R(s) is the reference input which represents the desired angle-of-direction of travel of the machine, Y(s) is the actual angle-of-direction of travel, and D(s) is a disturbance input which represents the load on the machine. Compare the impulse reference response (i.e., r(t) = delta(t), d(t) = o) for different values of p , the step reference response (i.e., r(t) = 1(t), d(t) = o) for different values of p , and the situation wherein there is both a step reference and a specified disturbance input: r(t) =1(t) ,d(t)= {1,o<=t<=4 2,4<=t<=8} All simulations are to be carried out over the time range o<=t <=8. Choose p = 1, 2,5 our discussions should include the effect of p on the steady-state values and the rise time

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clc;clear;closeall;
t1=0:0.01:4;
t2=4.01:0.01:8;
t=[t1 t2];
p=[1,2,5];
u=[2*ones(1,length(t1)),3*ones(1,length(t
2))];
for i=p:length(p)
sys=tf(1,[1 p(1) 0]);
subplot(3,1,i)
lsimplot(sys,u,t)
end
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EX-2)Open-loop response: Consider the following figure where the boring machine is represented by the transfer function G1(s)=11s+k, R(s) is the reference input which represents the desired angle-of-direction of travel of the machine, Y(s) is the actual angle-of-direction of travel, and D(s) is a disturbance input which represents the load on the machine. Compare the impulse reference response (i.e., r(t) = delta(t), d(t) = 0) for different values of p , the step reference response (i.e., r(t) = 1(t), d(t) = 0) for different values of p , and the situation wherein there is both a step reference and a specified disturbance input: r(t) =1(t) ,d(t)= {1,0<=t<=4 2,4<=t<=8} All simulations are to be carried out over the time range 0<=t <=8. Choose p = 1, 2,5 . Choose p = 1, 2, 5, and consider two different situations: K = 20, 100.

THANK YOU