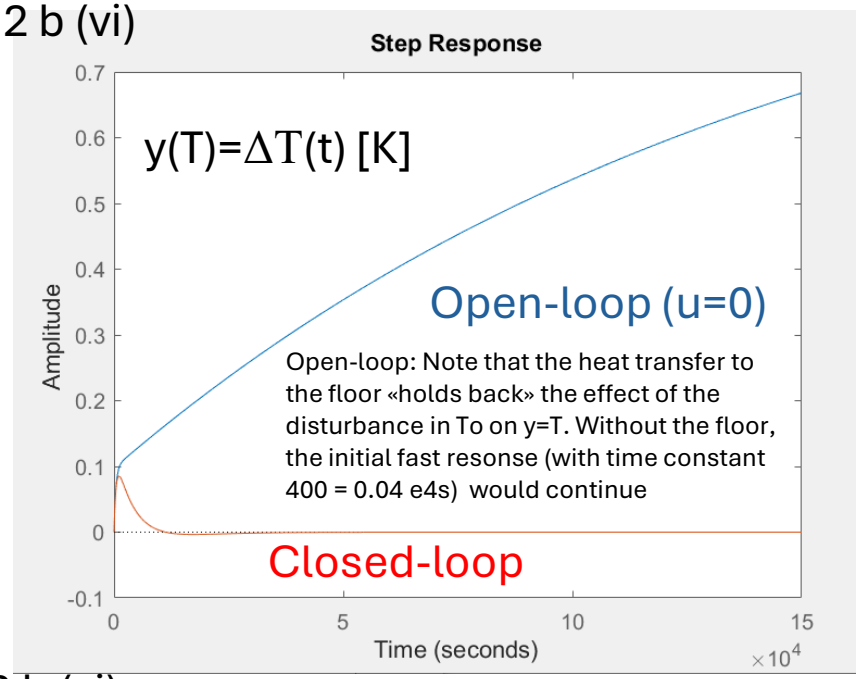
Exam 2024

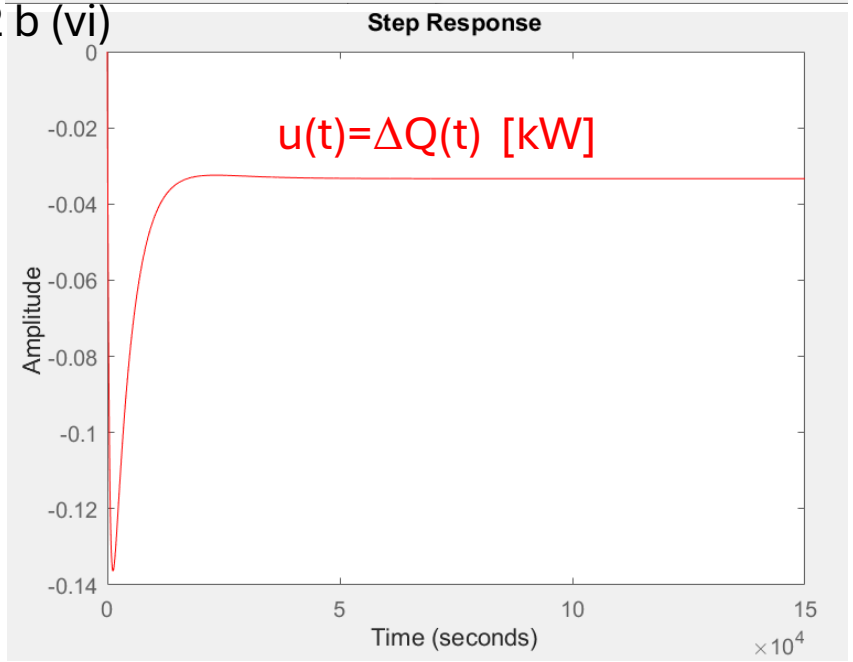
Process control

Problem 2b

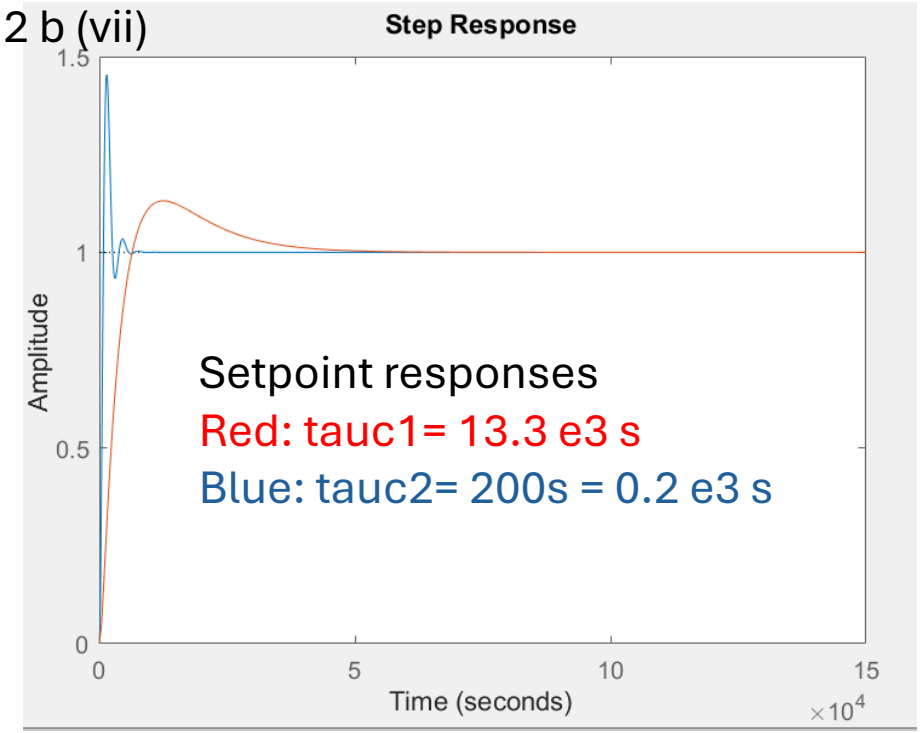
2 b (vi)



2 b (vi)



2 b (vii)




```
%Exam 2024
s=tf('s');
Gb = 30/((15e4*s+1)*(400*s+1))
Gdb = (1.5e4*s+1)/((15e4*s+1)*(400*s+1))
C = 1.5*(1 + 1/(13351*s))
S = 1/(1+Gb*C)
Td = S*Gdb
KSGd = -C*Td
figure(1), step(Gdb,Td,150e3)  % disturbance
figure(2), step(KSGd,150e3,'red')  % disturbance
T = 1-S
C2 = 12.5*(1+1/(1600*s))
S2 = 1/(1+Gb*C2); T2=1-S2;
figure(4), step(T2,T,150e3)  % setpoints
```

2 b (vii)

Discussion: (a) There is not much point in reducing tauc to tauc2 because the response with tauc1 is already good enough, even for setpoint changes. Actually the 50% overshoot for y=T with tauc2 is not desirable. (b) Cascade control (based on y2=Tf) Is not helpful because (i) there are no disturbances that directly effect Tf. (ii) there is no nonlinearity.