Matlab code:

%Willard Wider

%6/6/18

%lab5

%ELEC4400 DSP

%forward and backward difference stuff

%NOTE: steps 1-5 and 8 are written on paper

clear();

interval = 10^-3;

t = 0:interval:11;

k=1;

T=0;%just to declare it

y = exp(-k.\*t);%can be done here, does not change

figure();

%forwared

T=2.1;

fd = (1-(k\*T)).^t;

subplot(3,2,1);

plot(t,y);

hold on;

plot(t,fd);

hold off;

title(sprintf("FD T=%.1f, pole=-1.1",T));

T=1.5;

fd = (1-(k\*T)).^t;

subplot(3,2,3);

plot(t,y);

hold on;

plot(t,fd);

title(sprintf("FD T=%.1f, pole=-1.1",T));

hold off;

T=0.8;

fd = (1-(k\*T)).^t;

subplot(3,2,5);

plot(t,y);

hold on;

plot(t,fd);

title(sprintf("FD T=%.1f, pole=-1.1",T));

hold off;

%backward

T=2.1;

bd = (1+(k\*T)).^-t;

subplot(3,2,2);

plot(t,y);

hold on;

plot(t,bd);

title(sprintf("BD T=%.1f, pole=-1.1",T));

hold off;

T=1.5;

bd = (1+(k\*T)).^-t;

subplot(3,2,4);

plot(t,y);

hold on;

plot(t,bd);

title(sprintf("BD T=%.1f, pole=-1.1",T));

hold off;

T=0.8;

bd = (1+(k\*T)).^-t;

subplot(3,2,6);

plot(t,y);

hold on;

plot(t,bd);

title(sprintf("BD T=%.1f, pole=-1.1",T));

hold off;

