Z transform測試，s domain to z domain (連續轉數位)

測試PID補償器和雙線性轉換轉換

G\_zas = c2d(G, Sampling\_T, 'zoh'); % zero order

C\_az = c2d(C\_as, Sampling\_T, 'tustin') % 雙線性轉換

**Code:**

% Test z-transform, s domain -> z domain

clc, clear, close all

% Define the hyperparameter

Sampling\_T = 0.003; % Sampling cycle

zeta = 0.18; % damping ratio

wn = 27.78;

K = 771.61;

para1 = 0;

para2 = 1;

s = tf('s');

z=tf('z', Sampling\_T);

G = 1/((s)\*(s+1)\*(s+10));

G\_zas = c2d(G, Sampling\_T, 'zoh');

% design my control system (PID)

C\_as = K \* (s+para1) \* (s+para2) / s

C\_az = c2d(C\_as, Sampling\_T, 'tustin')

Ls = minreal(G \* C\_as) % simply

T\_s = minreal(Ls/(1+Ls)) % simply

% print the rlocus

figure();

rlocus(Ls);

title('Ls Root Locus')

hold on; grid on;

Lz = minreal(C\_az \* G\_zas) % simply

T\_z = minreal(Lz/(1+Lz)) % simply

% print the rlocus

figure();

rlocus(Ls);

title('Lz Root Locus')

hold on; zgrid(zeta, wn)

figure();

step(T\_s, T\_z);

legend('Analog Response', 'Digital Response');

title('Step Response')

grid on;





