%% Pitch response to elevator deflection

display(roots([1, 0.226, 0.0169]))

v\_dyn = zpk(-0.435, [-1.23, -0.1130+0.0643i, -0.1130-0.0643i], -0.125);

% Coeffs for tf block in Simulink

display(tf(v\_dyn))

%% Simplification

syms s;

syms s K1 K2;

G1 = -K1;

G2 = 2/(s+2);

G3 = (-0.125)\*(s+0.435)/((s+1.23)\*(s^2+0.226\*s+0.0169));

H = -K2\*s;

reduced\_sys = (G1\*G2\*G3)/(1+(G1\*G2\*G3)+(G2\*G3\*H));

%% Comparison

figure

hold on

plot(reduced, 'LineWidth', 1.15)

plot(original, '--', 'LineWidth', 1)

xlabel('Time (s)')

ylabel('Magnitude')

title('Comparison of Step Response')

legend('Reduced', 'Original')

grid







