
Problem 4: S&J, Problem 3.12

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fprintf('Problem 4: S&J, Problem 3.12')
clearvars -except function_list pub_opt
close all
fprintf('Initial Euler Angles (3-2-1):\n')
euler_angles = [40; 30; 80]; % degrees
printVector(euler_angles, 'degrees');

delta_t = 0.01;
t_end = 60 - delta_t; % seconds

% Arrays for recording and plotting
t_mat = 0:delta_t:t_end+delta_t;
[rows, cols] = size(t_mat);
EA_mat = zeros(3,cols);
EA_mat(:,1) = euler_angles;
idx = 2;

% Euler integration
for t = 0:delta_t:t_end

    w_body_frame = [sin(0.1*t); 0.01; cos(0.1*t)] * 20 * pi/180; % rad/s
    euler_angles_dot = BmatEuler('321', euler_angles*pi/180)*w_body_frame;
    %rad/s
    euler_angles = euler_angles + euler_angles_dot * delta_t * 180/pi;
    % degrees, position at t_(n+1)

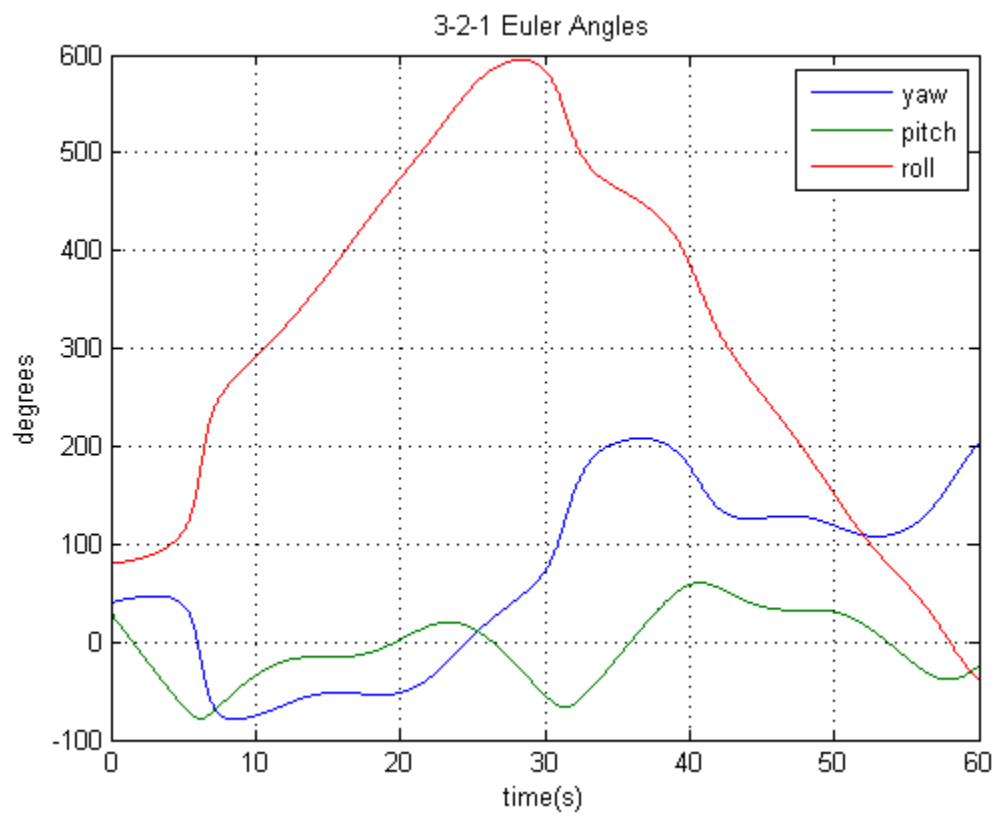
    % Updating array
    EA_mat(:,idx) = euler_angles;

    idx = idx + 1;
end

% The answer
fprintf('Euler angles after 60 seconds:\n')
printVector(euler_angles, 'degrees')

plot(t_mat, EA_mat);
title('3-2-1 Euler Angles')
xlabel('time(s)')
ylabel('degrees')
legend('yaw', 'pitch', 'roll')
grid on
fprintf('\n\n\n');
```

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Problem 4: S&J, Problem 3.12Initial Euler Angles (3-2-1):
[40.000000; 30.000000; 80.000000] degrees
Euler angles after 60 seconds:
[202.836353; -25.024653; -38.049288] degrees
```



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