```
clear all
close all
clc

time_final = 20; %Final time

%%%%%% MODIFY. Initial state values and parameter values
state = reshape(eye(3), [9,1]);
omega_ab_in_b = 2 * [1; 1; 1];

% Simulate dynamics
try
    %%%%%% MODIFY THE FUNCTION "Kinematics" TO PRODUCE SIMULATIONS OF THE SOLID ORIENTATION
    %%%%%%
    %%%%%% Hints:
    %%%%%% - "parameters" allows you to pass some parameters to the "Kinematic" function.
    %%%%%% - "state" will contain representations of the solid orientation (SO(3)).
    %%%%%% - use the "reshape" function to turn a matrix into a vector or vice-versa.

    [time,statetraj] = ode45(@(t,x)KinematicsDCM(t, x, omega_ab_in_b),[0, time_final],state);

catch message
    display('Your simulation failed with the following message:')
    display(message.message)
    display(' ')

    %Assign dummy time and states if simulation failed
    time = [0,10];
    statetraj = [0,0];
end

%Below is a template for a real-time animation
ScaleFrame = 5;    % Scaling factor for adjusting the frame size (cosmetic)
FS         = 15;   % Fontsize for text
SW         = 0.035; % Arrows size

time_display = 0; % initialise time_display
while time_display < time(end)

    state_animate = interp1(time,statetraj,time_display); %interpolate the simulated state at the current clock time

    p     = [5;5;5];  % Position of the single body

    %%%%%% MODIFY THE FOLLOWING LINES TO PRODUCE AN "omega" AND "R" FROM YOUR SIMULATION STATE

    omega = omega_ab_in_b;
    R = reshape(state_animate, [3,3]);

    %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

    %3D below this point
```

```
52      figure(1);clf;hold on
53      MakeFrame( zeros(3,1),eye(3),ScaleFrame,FS,SW,'a', 'color', 'k')
54      MakeFrame( p,R,ScaleFrame,FS,SW,'b', 'color', 'r')
55      MakeArrow( p,R*omega,FS,SW,'$$\omega$$', 'color', [0,0.5,0])
56      DrawRectangle(p,R ,'color',[0.5,0.5,0.5]);
57      FormatPicture([0;0;2],0.5*[73.8380   21.0967   30.1493])
58
59      if time_display == 0
60          display('Hit a key to start animation')
61          pause
62          tic
63      end
64      time_display = toc; %get the current clock time
65  end
66
```