

```
function [alpha,beta,gamma] = dcm_conv(Q,output,range)
%DCM_CONV Convert DCM to classical euler or yaw pitch roll sequence
% Inputs are:
%   Q       :a numeric array of 3x3 direction cosine matrix
%   output  :a string desired output sequence ('euler' or 'ypr')
%   range   :an optional string of desired range ('+/-pi' or '0_2pi'). Default
%             is '+/-pi'
%
% Output is:
%   alpha   :a scalar first angle in sequence in rad
%   beta    :a scalar second angle in sequence in rad
%   gamma   :a scalar third angle in sequence in rad
%
% Reference: ISBN 9780323853453, Algorithms 4.3 and 4.4

arguments
    Q (3,3) {mustBeNumeric, mustBeReal}
    output string
    range string = '+/-pi'
end

% Calculates angles based on desired sequence
switch output
    case 'euler'
        alpha = atan2(Q(3,1),-Q(3,2));
        beta = acos(Q(3,3));
        gamma = atan2(Q(1,3),Q(2,3));
    case 'ypr'
        alpha = atan2(Q(1,2),Q(1,1));
        beta = asin(-Q(1,3));
        gamma = atan2(Q(2,3),Q(3,3));
    otherwise
        error('Invalid output sequence')
end

% Converts angles to desired range
switch range
    case '+/-pi'
        return
    case '0_2pi'
        alpha = mod(alpha,2*pi);
        beta = mod(beta,2*pi);
        gamma = mod(gamma,2*pi);
    otherwise
        error('Invalid range')
end

end
```