Matlab functions for solution of one dimensional boundary value problem (p. 188)

For _Matlab_ solution of one dimensional boundary value problems using linear and quadratic element, the following functions can be defined and used in the manner shown in Chapter 2 for axial deformation problem.

MatlabFiles\Chap3\BVP1DLinElement.m

```
function [ke, re] = BVP1DLinElement(k, p, q, coord)
% [ke, re] = BVP1DLinElement(k, p, q, coord)
% Generates equations for a linear element for 1D BVP
% k,p,q = parameters defining the BVP
% coord = coordinates at the element ends

L=coord(2)-coord(1);
ke = [k/L - (L*p)/3, -(k/L) - (L*p)/6;
    -(k/L) - (L*p)/6, k/L - (L*p)/3];
re = [(L*q)/2; (L*q)/2];
```

MatlabFiles\Chap3\BVP1DQuadElement.m

```
function [ke, re] = BVP1DQuadElement(k, p, q, coord)
% [ke, re] = BVP1DQuadElement(k, p, q, coord)
% Generates equations for a quadratic element for 1D BVP
% k,p,q = parameters defining the BVP
% coord = coordinates at the element ends

L=coord(3)-coord(1);
ke = [(7*k)/(3*L) - (2*L*p)/15, (-8*k)/(3*L) - (L*p)/15, ...
        k/(3*L) + (L*p)/30;
    (-8*k)/(3*L) - (L*p)/15, (16*k)/(3*L) - (8*L*p)/15, ...
        (-8*k)/(3*L) - (L*p)/15;
    k/(3*L) + (L*p)/30, (-8*k)/(3*L) - (L*p)/15, ...
        (7*k)/(3*L) - (2*L*p)/15];
re = [(L*q)/6; (2*L*q)/3; (L*q)/6];
```