Computer Implementation 6.5 ***(Matlab)*** *3D numerical integration (p. 420)*

Consider evaluation of the following integral using Gauss quadrature.

$$I = \int_{-1}^{1}\int_{-1}^{1}\int_{-1}^{1}(400\,t^5 + 675\,t^3 - 900\,s^4 - 200\,s^2 + 25\,r + 0.2)\,\mathrm{dr\ ds\ dt}$$

MatlabFiles\Chap6\ThreeDGaussQuadratureEx.m

```
% Integration over a cube using 1x2x3 Gaussian quadrature
gaussPoints=[0., -0.5773502691896257, -0.7745966692414834;
   0., -0.5773502691896257, 0.;
   0., -0.5773502691896257, 0.7745966692414834;
   0., 0.5773502691896257, -0.7745966692414834;
   0., 0.5773502691896257, 0.;
   0., 0.5773502691896257, 0.7745966692414834];

gaussWeights=[1.111111111111111, 1.777777777777777, ...
      1.111111111111111, 1.111111111111111, ...
      1.777777777777777, 1.111111111111111];
int=0;
for i=1:length(gaussWeights)
   r = gaussPoints(i,1); s = gaussPoints(i,2); t = gaussPoints(i,3);
   frst = 0.2 + 25*r - 200*s^2 + 675*t^3 - 900*s^4 + 400*t^5;
   int = int + gaussWeights(i)*frst;
end
int

>> ThreeDGaussQuadratureEx

int =

 -1.3317e+003
```