Computer Implementation 6.3 ***(Matlab)*** *1D numerical integration (p. 413)*

Evaluation of the following integral using five-point Gauss quadrature.

$$I = \int_{-1}^{1} (\text{Exp}[s]\,\text{Sin}[s]/(1+s^2))\,ds$$

MatlabFiles\Chap6\OneDGaussQuadratureEx.m

```
% Integration using 5 point Gaussian quadrature
gaussPoints=[-0.906179845938664, -0.5384693101056831, 0.,...
   0.5384693101056831, 0.906179845938664];

gaussWeights=[0.2369268850561894, 0.4786286704993625, 0.5688888888888889,...
   0.4786286704993625, 0.2369268850561894];
int=0;
for i=1:length(gaussWeights)
   s = gaussPoints(i);
   fs = exp(s)*sin(s)/(1+s^2);
   int = int + gaussWeights(i)*fs;
end
int
```

```
>> OneDGaussQuadratureEx

int =

   0.4270
```

The built-in *Matlab* function quadl uses an adaptive approach. It keeps increasing the order of integration until the integral has been evaluated to a desired precision.

```
>> quadl('exp(s).*sin(s)./(1+s.^2)',-1,1)

ans =

   0.4274
```