In[14]:=
```
IT[f_, a_, b_, n_] := (h = (b - a) / n; Sum[(f[a + (i - 1) * h] + f[a + i * h]) * h / 2, {i, 1, n}])
RI[f_, a_, b_, k_, n1_] := (RItable  = Table["N/A", {i, 1, k}, {j, 1, k}];
Do[RItable [[i, 1]] = IT[f, a, b, 2^(i - 1) * n1], {i, 1, k}];
 Do[RItable [[j, ik]] = (2^(2 (ik - 1)) RItable [[j + 1, ik - 1]] - RItable [[j, ik - 1]]) /
      (2^(2 (ik - 1)) - 1), {ik, 2, k}, {j, 1, k - ik + 1}];
 ERtable  =  Table [(RItable [[1, i + 1]] - RItable [[1, i]]) / RItable [[1, i + 1]], {i, 1, k - 1}];
 {RItable , ERtable })
a = 0.0;
b = 2;
k = 3;
n1 = 1;
f[x_] := E^x
Integrate [f[x], {x, a, b}]
s = RI[f, a, b, k, n1];
s[[1]] // MatrixForm
s[[2]] // MatrixForm
```

Out[21]=
```
6.38906
```

Out[23]//MatrixForm=

$$\begin{pmatrix} 8.38906 & 6.42073 & 6.38924 \\ 6.91281 & 6.39121 & \text{N/A} \\ 6.52161 & \text{N/A} & \text{N/A} \end{pmatrix}$$

Out[24]//MatrixForm=

$$\begin{pmatrix} -0.306558 \\ -0.00492789 \end{pmatrix}$$

In[25]:=
```
ClearAll
```

Out[25]=
```
ClearAll
```

In[26]:=
```
IT[f_, a_, b_, n_] := (h = (b - a) / n;  Sum[(f[a + (i - 1) * h] + f[a + i * h]) * h / 2, {i, 1, n}])
RI[f_, a_, b_, k_, n1_] := (RItable  = Table["N/A", {i, 1, k}, {j, 1, k}];
 Do[RItable [[i, 1]] = IT[f, a, b, 2^(i - 1) * n1], {i, 1, k}];
 Do[RItable [[j, ik]] = (2^(2 (ik - 1)) RItable [[j + 1, ik - 1]] - RItable [[j, ik - 1]]) /
      (2^(2 (ik - 1)) - 1), {ik, 2, k}, {j, 1, k - ik + 1}];
 ERtable  = Table [(RItable [[1, i + 1]] - RItable [[1, i]]) / RItable [[1, i + 1]], {i, 1, k - 1}];
 {RItable , ERtable })
a = 0.0;
b = 2;
(*Depth  of  Romberg  Table *)
k = 3;
n1 = 1;
f[x_] := E^x
Itrue  = Integrate [f[x], {x, a, b}]
s = RI[f, a, b, k, n1];
s[[1]] // MatrixForm
s[[2]] // MatrixForm
ErrorTable  = Table [If[RItable [[i, j]] == "N/A", "N/A", Abs[Itrue  - RItable [[i, j]]]],
   {i, 1, Length [RItable ]}, {j, 1, Length [RItable ]}];
ErrorTable  // MatrixForm
```

Out[33]=
```
6.38906
```

Out[35]//MatrixForm=

$$\begin{pmatrix} 8.38906 & 6.42073 & 6.38924 \\ 6.91281 & 6.39121 & \text{N/A} \\ 6.52161 & \text{N/A} & \text{N/A} \end{pmatrix}$$

Out[36]//MatrixForm=

$$\begin{pmatrix} -0.306558 \\ -0.00492789 \end{pmatrix}$$

Out[38]//MatrixForm=

$$\begin{pmatrix} 2. & 0.0316717 & 0.000186247 \\ 0.523754 & 0.00215409 & \text{N/A} \\ 0.132554 & \text{N/A} & \text{N/A} \end{pmatrix}$$

In[39]:=
```
ClearAll
```

Out[39]=
```
ClearAll
```

In[40]:=
```
IT[f_, a_, b_, n_] := (h = (b - a)/n;  Sum[(f[a + (i - 1)*h] + f[a + i*h])*h/2, {i, 1, n}])
a = 0.0;
b = 1.5;
f[x_] := 2 + 2 x + x^2 + Sin[2 Pi*x] + Cos[2 Pi*x/0.5]
Title = {"n", "h", "I_T", "I_true", "|E|"};
Ii = Table[{2^(i - 1), (b - a)/2^(i - 1),
     ss = IT[f, a, b, 2^(i - 1)], Itrue, Abs[Itrue - ss]}, {i, 1, 8}];
Ii = Prepend[Ii, Title];
Ii // MatrixForm
```

Out[47]//MatrixForm=

n	h	I_T	I_true	|E|
1	1.5	8.4375	6.38906	2.04844
2	0.75	5.76563	6.38906	0.623431
4	0.375	6.56549	6.38906	0.17643
8	0.1875	6.6644	6.38906	0.275347
16	0.09375	6.68625	6.38906	0.297193
32	0.046875	6.69155	6.38906	0.302499
64	0.0234375	6.69287	6.38906	0.303816
128	0.0117188	6.6932	6.38906	0.304144