In[17]:=
```
(* Mathematica program to print finite difference apprximation table *)
(* approximation of derivative of sin(x) using different step size *)
(* Nasser M. Abbasi, oct 2, 2010 *)

h = {0.1, 0.05, 0.01, 0.005, 0.001};
exact = Cos[1];
derivativeRight[h_] := (Sin[1.0 + h] - Sin[1.0 ]) / h;
derivativeLeft[h_] := (Sin[1.0] - Sin[1.0 - h]) / h;
derivativeCenter[h_] := (Sin[1.0 + h] - Sin[1.0 - h]) / (2.0 * h);
derivative3rdOrder[h_] :=
  (2.0 * Sin[1.0 + h] + 3.0 * Sin[1.0] - 6.0 * Sin[1.0 - h] + Sin[1.0 - 2.0 * h]) / (6.0 * h);

data = Table[{h[[i]],
    derivativeRight[h[[i]]] - exact,
    derivativeLeft[h[[i]]] - exact,
    derivativeCenter[h[[i]]] - exact,
    derivative3rdOrder[h[[i]]] - exact}, {i, 1, Length[h]}
  ];


ScientificForm[TableForm[SetPrecision[data, MachinePrecision],
  TableHeadings → {None, {"h", "D+", "D", "D0", "D3"
}}, TableAlignments → Left
 ], {5, 4}, NumberFormat → (Row[{#1, "e", #3}] &), NumberPadding → {"", "0"}]
```

Out[24]//ScientificForm=

h	D+	D	D0	D3
1.0000e-1	-4.2939e-2	4.1138e-2	-9.0005e-4	6.8207e-5
5.0000e-2	-2.1257e-2	2.0807e-2	-2.2510e-4	8.6491e-6
1.0000e-2	-4.2163e-3	4.1983e-3	-9.0050e-6	6.9941e-8
5.0000e-3	-2.1059e-3	2.1014e-3	-2.2513e-6	8.7540e-9
1.0000e-3	-4.2083e-4	4.2065e-4	-9.0050e-8	7.0053e-11