A.J. Sommese 2012

```
> with(CurveFitting);
NN := 30;
> for N from 1 to NN do
x:= Vector(N+1);
y:= Vector(N+1);
for j from 1 to N + 1
do
x[j] := (j-1)/N;
y[j] := f[j-1];
od;
p||N := unapply(PolynomialInterpolation(x,y,t),t):
od:
```

[*ArrayInterpolation*, *BSpline*, *BSplineCurve*, *Interactive*, *LeastSquares*, *PolynomialInterpolation*, *RationalInterpolation*, *Spline*, *ThieleInterpolation*]

$$NN := 30$$

```
>
> for N from 1 to NN do IF||N:=int(p||N(t),t=0..1); od:
> for N from 1 to 10 do
print(N);
print(IF||N);
od;
```

$$1$$

$$\frac{1}{2}f_1+\frac{1}{2}f_0$$

$$2$$

$$\frac{1}{6}f_2+\frac{2}{3}f_1+\frac{1}{6}f_0$$

$$3$$

$$\frac{1}{8}f_3+\frac{3}{8}f_2+\frac{3}{8}f_1+\frac{1}{8}f_0$$

$$4$$

$$\frac{7}{90}f_4+\frac{16}{45}f_3+\frac{2}{15}f_2+\frac{7}{90}f_0+\frac{16}{45}f_1$$

$$5$$

$$\frac{19}{288}f_0+\frac{25}{96}f_1+\frac{25}{144}f_2+\frac{25}{144}f_3+\frac{25}{96}f_4+\frac{19}{288}f_5$$

$$6$$

$$\frac{41}{840} f_0 + \frac{9}{35} f_1 + \frac{9}{280} f_2 + \frac{34}{105} f_3 + \frac{9}{280} f_4 + \frac{9}{35} f_5 + \frac{41}{840} f_6$$

7

$$\frac{751}{17280} f_0 + \frac{3577}{17280} f_1 + \frac{49}{640} f_2 + \frac{2989}{17280} f_3 + \frac{2989}{17280} f_4 + \frac{49}{640} f_5 + \frac{3577}{17280} f_6 + \frac{751}{17280} f_7$$

8

$$\frac{989}{28350} f_0 + \frac{2944}{14175} f_1 - \frac{464}{14175} f_2 + \frac{5248}{14175} f_3 - \frac{454}{2835} f_4 + \frac{5248}{14175} f_5 - \frac{464}{14175} f_6 + \frac{2944}{14175} f_7 + \frac{989}{28350} f_8$$

9

$$\frac{2857}{89600} f_0 + \frac{15741}{89600} f_1 + \frac{27}{2240} f_2 + \frac{1209}{5600} f_3 + \frac{2889}{44800} f_4 + \frac{2889}{44800} f_5 + \frac{1209}{5600} f_6 + \frac{27}{2240} f_7 + \frac{15741}{89600} f_8 + \frac{2857}{89600} f_9$$

10

$$\frac{16067}{598752} f_0 + \frac{26575}{149688} f_1 - \frac{16175}{199584} f_2 + \frac{5675}{12474} f_3 - \frac{4825}{11088} f_4 + \frac{17807}{24948} f_5 - \frac{4825}{11088} f_6 + \frac{5675}{12474} f_7 - \frac{16175}{199584} f_8 + \frac{26575}{149688} f_9 + \frac{16067}{598752} f_{10}$$

```
> for N from 1 to NN do
for j from 0 to N do
a[j]:= coeff(IF||N,f[j]);
od;
Err[N] := sum(abs(a[h]),h=0..N):
print(sum(a[h],h=0..N), evalf(Err[N]));
od:
```

1, 1.

1, 1.

1, 1.

1, 1.

1, 1.

1, 1.

1, 1.

1, 1.

1, 1.451216931

1, 1.

1, 3.064794773

1, 1.589389284

1, 7.531736644

1, 3.247132553

1, 20.34354977

1, 8.348084926

1, 58.45738092

1, 22.21673509

1, 175.4632224

1, 63.24684727

1, 544.1771560

1, 186.4283864

1, 1731.638280

1, 567.4264427

1, 5626.401824

1, 1769.574151

1, 18600.47563

1, 5633.717134

1, 62398.08687

1, 18248.80763

1, 211964.3396