

```
In[*]:= Clear["Global`*"]
```

```
In[*]:= B[n_, i_] := Binomial[n, i] * (t^i) * (1 - t)^(n - i)
```

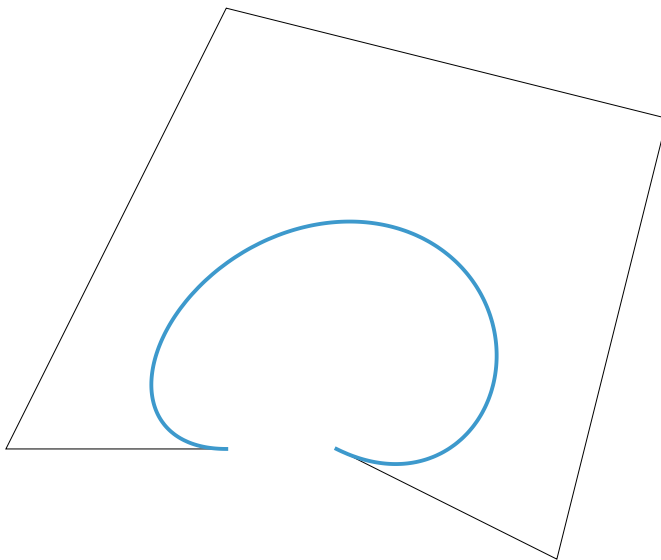
```
In[*]:= P = {{0, 0}, {2, -1}, {3, 3}, {-1, 4}, {-3, 0}, {-1, 0}}
n = Length[P] - 1
pl1 = Graphics[Line[P]];
c = Sum[P[[i + 1]] * B[n, i], {i, 0, n}]
pl2 = ParametricPlot[c, {t, 0, 1}];
Show[pl1, pl2]
```

```
Out[*]=
{{0, 0}, {2, -1}, {3, 3}, {-1, 4}, {-3, 0}, {-1, 0}}
```

```
Out[*]=
5
```

```
Out[*]=
{10 (1 - t)^4 t + 30 (1 - t)^3 t^2 - 10 (1 - t)^2 t^3 - 15 (1 - t) t^4 - t^5,
-5 (1 - t)^4 t + 30 (1 - t)^3 t^2 + 40 (1 - t)^2 t^3}
```

```
Out[*]=
```



```
In[*]:= P
t0 = 1/3
```

```
Out[*]=
{{0, 0}, {2, -1}, {3, 3}, {-1, 4}, {-3, 0}, {-1, 0}}
```

```
Out[*]=
1/3
```

```
In[*]:= DCnext[P_, t_] := Table[ P[[i]] * (1 - t) + P[[i + 1]] * t, {i, 1, Length[P] - 1}]
```

```
In[*]:= DCnext[P, 1/3]
```

```
Out[*]=
{{2/3, -1/3}, {7/3, 1/3}, {5/3, 10/3}, {-5/3, 8/3}, {-7/3, 0}}
```

```
In[*]:= CD = Table[0, {i, 0, n}]
```

```
Out[*]=
{0, 0, 0, 0, 0, 0}
```

```
In[*]:= CD[[1]] = P
```

```
Out[*]=
{{0, 0}, {2, -1}, {3, 3}, {-1, 4}, {-3, 0}, {-1, 0}}
```

```
In[*]:= CD
```

```
Out[*]=
{{{0, 0}, {2, -1}, {3, 3}, {-1, 4}, {-3, 0}, {-1, 0}}, 0, 0, 0, 0, 0}
```

```
In[*]:= For[i = 2, i ≤ n + 1, i++, CD[[i]] = DCnext[CD[[i - 1]], t0]]
```

```
In[*]:= CD
```

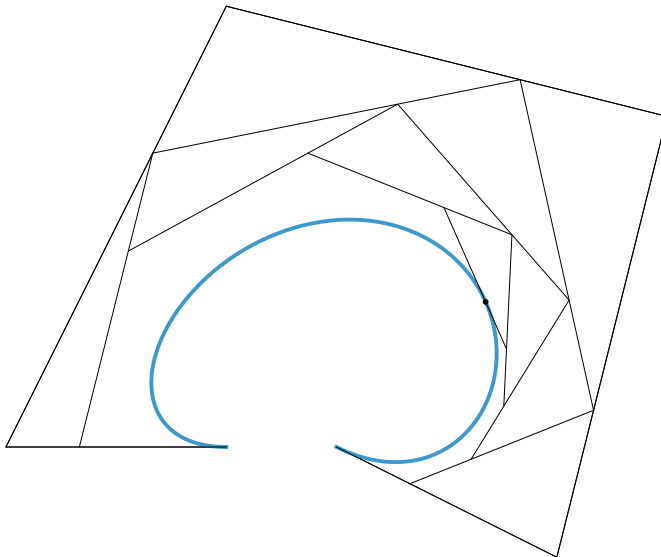
```
Out[*]=
{{{0, 0}, {2, -1}, {3, 3}, {-1, 4}, {-3, 0}, {-1, 0}},
 {{2/3, -1/3}, {7/3, 1/3}, {5/3, 10/3}, {-5/3, 8/3}, {-7/3, 0}},
 {{11/9, -1/9}, {19/9, 4/3}, {5/9, 28/9}, {-17/9, 16/9}},
 {{41/27, 10/27}, {43/27, 52/27}, {-7/27, 8/3}}, {{125/81, 8/9}, {79/81, 176/81}}, {{329/243, 320/243}}}
```

```
In[*]:= pl3 = Graphics[Point[CD[[n + 1]]];
```

```
pl4 = Graphics[Line[CD];
```

```
In[*]:= Show[pl1, pl2, pl3, pl4]
```

```
Out[*]=
```



```
In[*]:= PR = Table[CD[[i, 1]], {i, 1, n + 1}]
```

```
Out[*]=
{{0, 0}, {2/3, -1/3}, {11/9, -1/9}, {41/27, 10/27}, {125/81, 8/9}, {329/243, 320/243}}
```

```
In[*]:= cR = Sum[PR[[i + 1]] * B[n, i], {i, 0, n}]
```

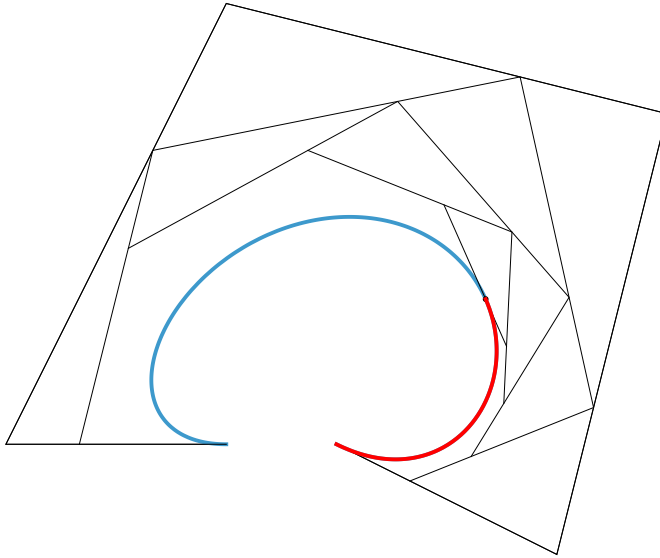
```
Out[*]=
```

$$\left\{ \frac{10}{3} (1-t)^4 t + \frac{110}{9} (1-t)^3 t^2 + \frac{410}{27} (1-t)^2 t^3 + \frac{625}{81} (1-t) t^4 + \frac{329 t^5}{243}, \right. \\ \left. -\frac{5}{3} (1-t)^4 t - \frac{10}{9} (1-t)^3 t^2 + \frac{100}{27} (1-t)^2 t^3 + \frac{40}{9} (1-t) t^4 + \frac{320 t^5}{243} \right\}$$

```
In[*]:= pl5 = ParametricPlot[cR, {t, 0, 1}, PlotStyle -> Red];
```

```
In[*]:= Show[pl1, pl2, pl3, pl4, pl5]
```

```
Out[*]=
```



```
In[*]:= c
```

```
cR
```

```
Out[*]=
```

$$\left\{ 10 (1-t)^4 t + 30 (1-t)^3 t^2 - 10 (1-t)^2 t^3 - 15 (1-t) t^4 - t^5, \right. \\ \left. -5 (1-t)^4 t + 30 (1-t)^3 t^2 + 40 (1-t)^2 t^3 \right\}$$

```
Out[*]=
```

$$\left\{ \frac{10}{3} (1-t)^4 t + \frac{110}{9} (1-t)^3 t^2 + \frac{410}{27} (1-t)^2 t^3 + \frac{625}{81} (1-t) t^4 + \frac{329 t^5}{243}, \right. \\ \left. -\frac{5}{3} (1-t)^4 t - \frac{10}{9} (1-t)^3 t^2 + \frac{100}{27} (1-t)^2 t^3 + \frac{40}{9} (1-t) t^4 + \frac{320 t^5}{243} \right\}$$

```
In[*]:= t0
```

```
Out[*]=
```

$$\frac{1}{3}$$

```
In[*]:= Together[(c /. {t -> t * t0}) - cR]
```

```
Out[*]=
```

$$\{0, 0\}$$