

Aproximácia funkcie

Príklad Nájďme aproximačný polynóm pre funkciu zadanú pomocou tabuľky

| | | | | | |
|---|----|---|---|----|----|
| x | -1 | 0 | 3 | 4 | 5 |
| y | 1 | 0 | 9 | 16 | 25 |

(hodnoty funkcie $y = x^2$).

Riešenie:

```
octave:1> x=[-1,0,3,4,5];y=[1,0,9,16,25];
```

```
octave:2> priamka=polyfit(x,y,1)
```

```
priamka =
```

```
3.8358 1.7612
```

```
octave:3> priamka=polyreduce(priamka);polyout(priamka,"x");
```

```
3.836*x^1 + 1.761
```

Teda polynóm pre $n=1$ je $priamka = 3,8358x + 1,7612$

```
octave:4> t=-1:1:5;yt=polyval(priamka,t)
```

```
yt =
```

```
-2.0746 1.7612 5.5970 9.4328 13.2687 17.1045 20.9403
```

```
octave:5> parabola=polyfit(x,y,2)
```

```
parabola =
```

```
1.0000e+00 8.6158e-16 -1.0092e-15
```

```
octave:6> parabola=polyreduce(parabola);polyout(parabola,"x");
```

```
1*x^2 + 8.616e-16*x^1 - 1.009e-15
```

Teda polynóm pre $n=2$ je $parabola = 1.x^2 + (8,6158e-16)x + -1,0092e-15$.

```
octave:7> t=-1:1:5;yt=polyval(parabola,t) % hodnoty vypočítané pomocou funkcie parabola
```

```
yt =
```

```
Columns 1 through 5:
```

```
1.0000e+00 -1.0092e-15 1.0000e+00 4.0000e+00 9.0000e+00
```

```
Columns 6 and 7:
```

```
1.6000e+01 2.5000e+01
```

Ďalšie možnosti aproximácie:

```
usage: yi = interp1(x, y, xi [, 'method' [, 'extrap']])
```

Interpolate the function $y=f(x)$ at the points x_i . The sample points x must be strictly monotonic. If y is a matrix with $\text{length}(x)$ rows, y_i will be a matrix of size $\text{rows}(x_i)$ by $\text{columns}(y)$, or its transpose if x_i is a row vector.

Method is one of:

'nearest': return nearest neighbour.

'linear': linear interpolation from nearest neighbours

'pchip': piece-wise cubic hermite interpolating polynomial

'cubic': cubic interpolation from four nearest neighbours

'spline': cubic spline interpolation--smooth first and second

derivatives throughout the curve

['*' method]: same as method, but assumes x is uniformly spaced

only uses $x(1)$ and $x(2)$; usually faster, never slower

Method defaults to 'linear'.