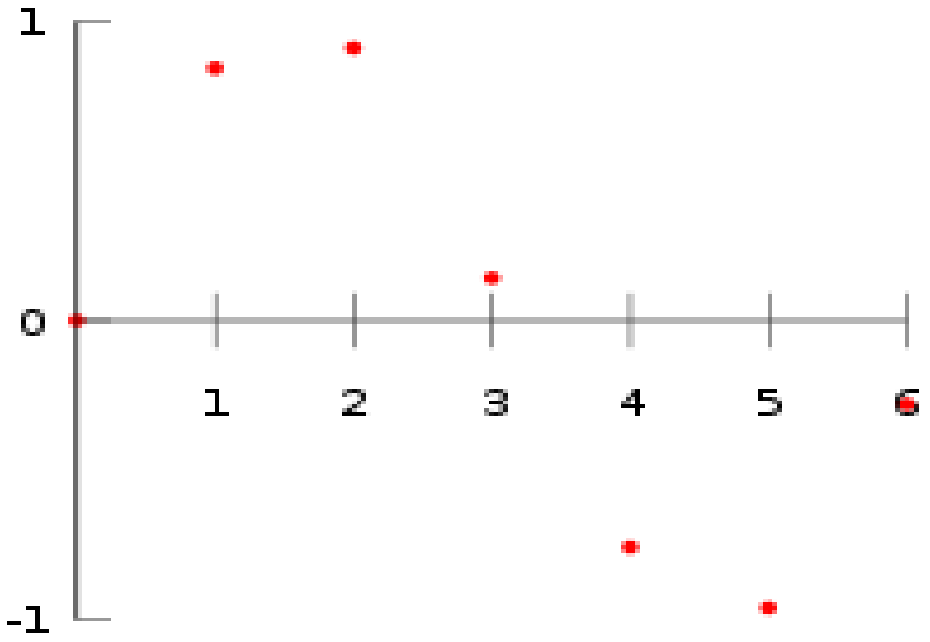
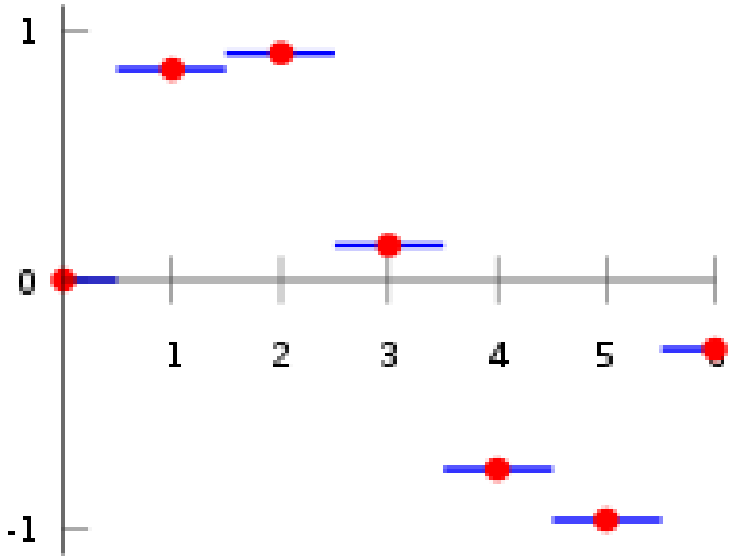
Interpolation

X	f(x)
1	0.8415
2	0.9093
3	0.1411
4	-0.7568
5	-0.9589
6	-0.2794

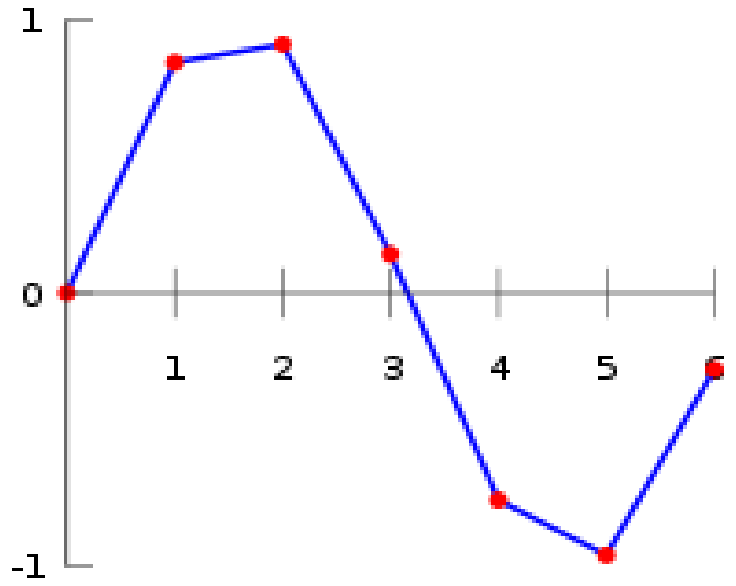


Linear interpolation

Generally, linear interpolation takes two data points, say (x_a,y_a) and (x_b,y_b), and the interpolant is given by:



$$y = y_a + (y_b - y_a)\,\frac{x - x_a}{x_b - x_a} \quad \text{at the point } (x, y)$$



Interp 1

One-dimensional data interpolation

Syntax

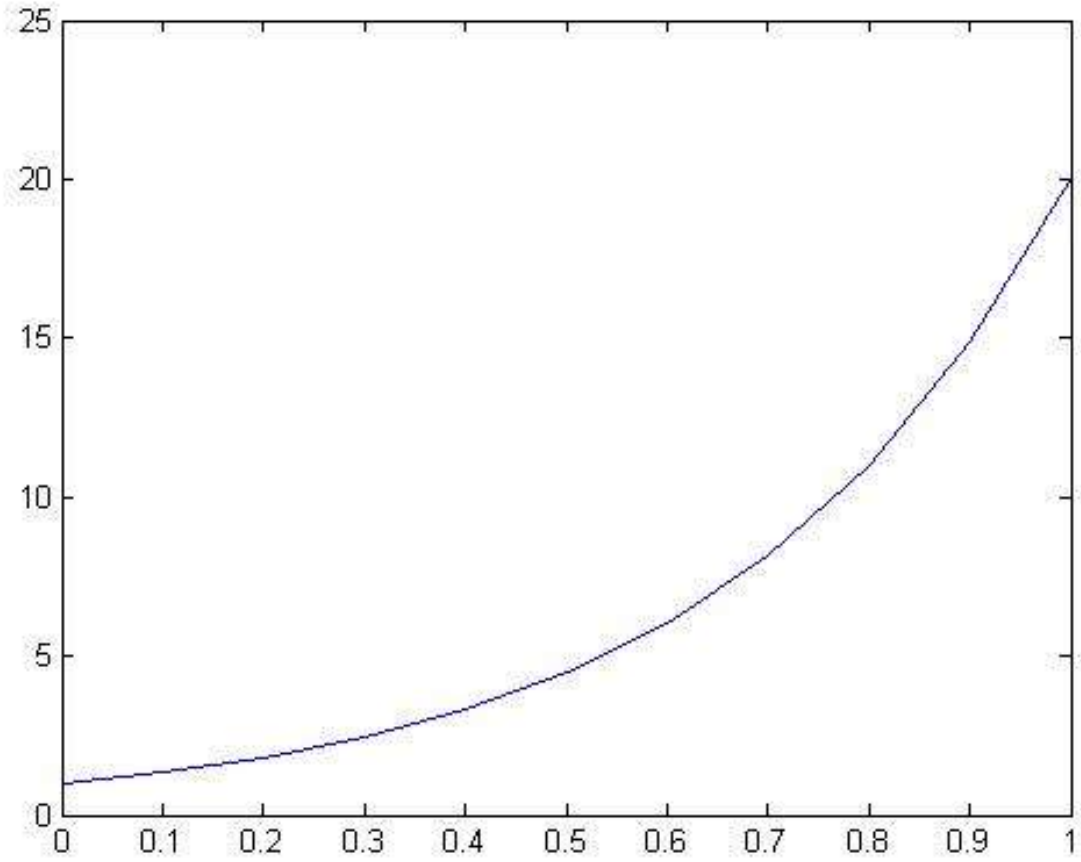
- yi = interp1(x,y,xg)
- yi = interp1(y,xg)
- yi = interp1(x,y,xg,method)

interpolates using alternative methods:

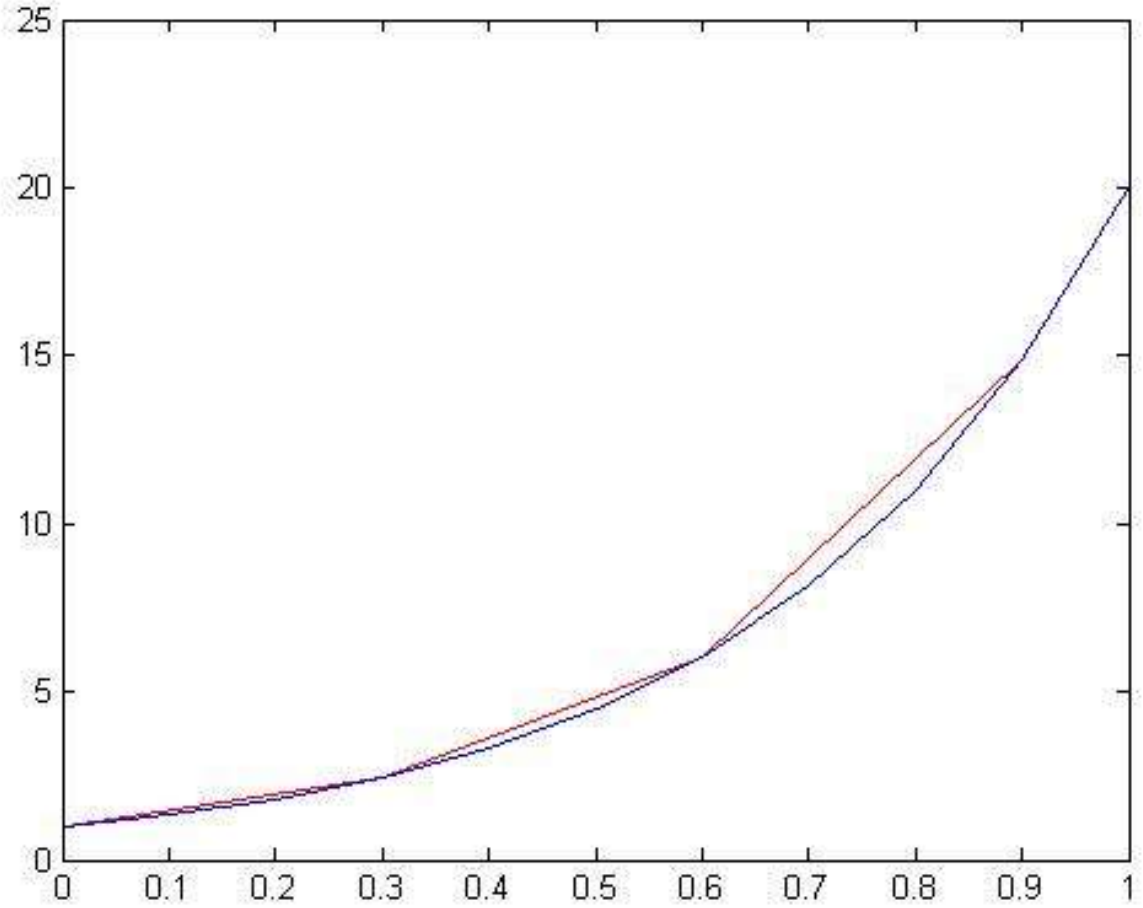
'nearest'	Nearest neighbor interpolation
'linear'	Linear interpolation (default)
'spline'	Cubic spline interpolation
'pchip'	Piecewise cubic Hermite interpolation
'cubic'	(Same as 'pchip')
'v5cubic'	Cubic interpolation used in MATLAB 5

EX: when x is interval from 0 to 1 with step 0.1 and y = e^{3x} up to found the interpolation using different methods:

```
x=0:0.1:1;
y=exp(3*x);
plot(x,y)
```



```
x=0:0.1:1;
y=exp(3*x);
xg=0:0.3:1;
k=interp1(x,y,xg)
plot(xg,k,'r',x,y)
```



```
x=0:0.1:1;

y=exp(3*x);

xg=0:0.25:1;

k1=interp1(x,y,xg,'linear')

k2=interp1(x,y,xg,'nearest')

k3=interp1(x,y,xg,'cubic')
```