

```
In[*]:= SetOptions[SelectedNotebook[],
  PrintingStyleEnvironment -> "Printout", ShowSyntaxStyles -> True]
```

```
In[*]:= V0 = 10.; a = 0.5; L = 1.;
n = 11;
phi[k_?NumericQ] := If[OddQ[k], Cos[ $\frac{k \pi x}{2 L}$ ], Sin[ $\frac{k \pi x}{2 L}$ ]]
```

```
In[*]:= H = Quiet@ParallelTable[If[k1 == k2,  $\frac{k_1^2 \pi^2}{8}$ , 0] +
  V0 Quiet@NIntegrate[phi[k1] phi[k2], {x, -a, a}, AccuracyGoal -> 4], {k1,
  1, n}, {k2, 1, n}];
```

```
H // MatrixForm;
{evals, efns} = Eigensystem[H];
Reverse@Take[evals, -4]
```

```
Out[*]=
{7.76594, 8.75999, 16.1812, 25.6011}
```

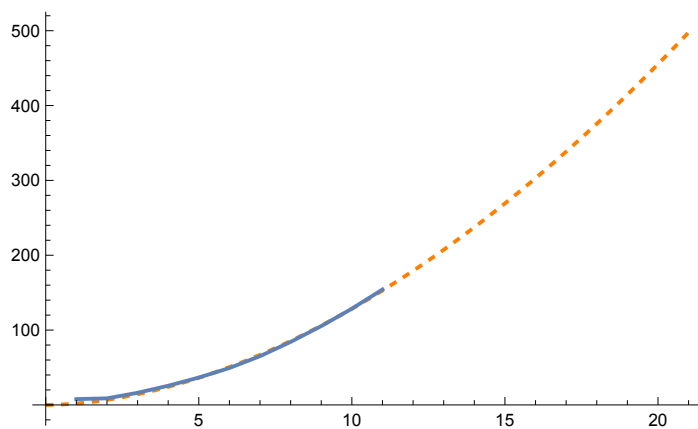
```
enFit = NonlinearModelFit[Reverse@evals, k x^b, {k, b}, x];
enFit["ParameterTable"]
```

```
Out[*]=
```

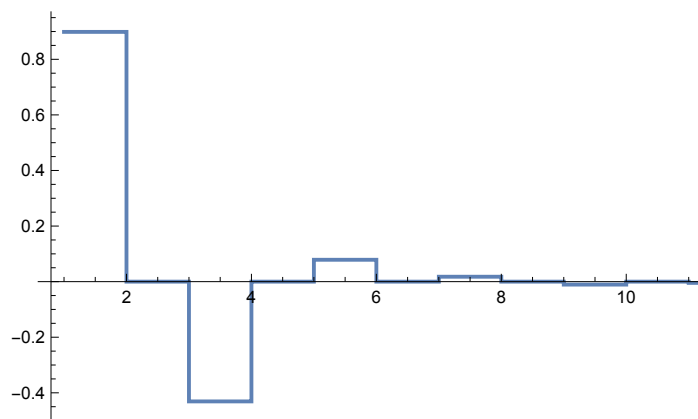
	Estimate	Standard Error	t-Statistic	P-Value
k	1.91432	0.18677	10.2496	2.91328 $\times 10^{-6}$
b	1.82647	0.0436527	41.8411	1.26863 $\times 10^{-11}$

```
Show[Plot[enFit["BestFit"], {x, 0, n + 10}, PlotStyle -> {Dashed, Orange}],
ListLinePlot[Reverse@evals, ImageSize -> Medium]]
ListStepPlot[Last@efns, PlotRange -> Full, ImageSize -> Medium]
```

Out[\*]=



Out[\*]=



```
efns = #.Table[ $\phi[k]$ , {k, 1, n}] & /@ efns;
With[{enFit = Take[efns, -5]}, Plot[enFit, {x, -L, L}]]
```

Out[\*]=

