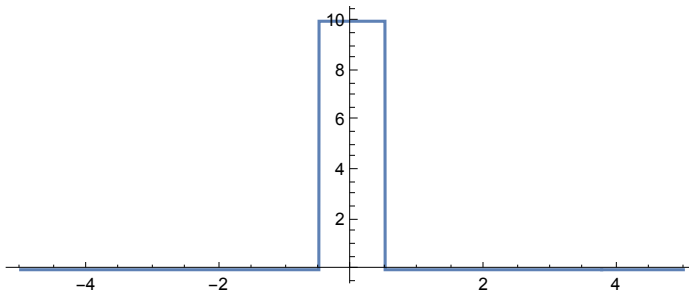


Definite-energy scattering states by the shooting method

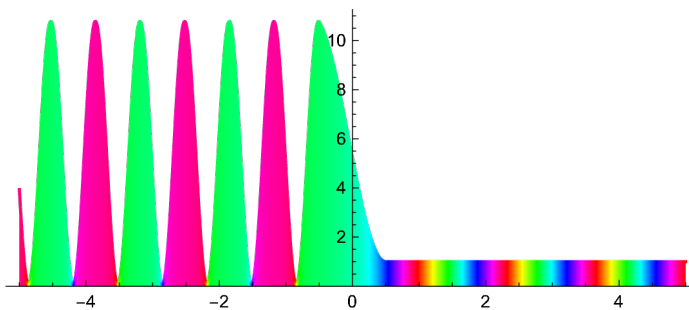
```
In[1]:= u[x_] := If[Abs[x] < 0.5, 10, 0];  
xMax = 5;  
Plot[u[x], {x, -xMax, xMax}, Exclusions -> None, AspectRatio -> 0.4]
```

Out[3]=



```
In[11]:= energy = 11;  
k = Sqrt[2 * energy];  
solution = NDSolve[{psi''[x] == -2 (energy - u[x]) psi[x],  
psi[xMax] == 1, psi'[xMax] == I * k}, psi, {x, -xMax, xMax}];  
Plot[Abs[psi[x]]^2 /. solution, {x, -xMax, xMax}, PlotRange -> {0, All},  
Filling -> Axis, ColorFunction -> Function[x, Hue[Arg[psi[x] /. solution] / (2 Pi)]],  
ColorFunctionScaling -> False, PlotPoints -> 500, AspectRatio -> 0.4]
```

Out[14]=



```
In[15]:= max = FindMaximum[Abs[psi[x]] /. solution, {x, -.8 xMax, -.5 xMax}][[1]];  
min = FindMinimum[Abs[psi[x]] /. solution, {x, -.8 xMax, -.5 xMax}][[1]];  
reflection = (max - min) / (max + min) ^ 2
```

Out[17]= 0.689196