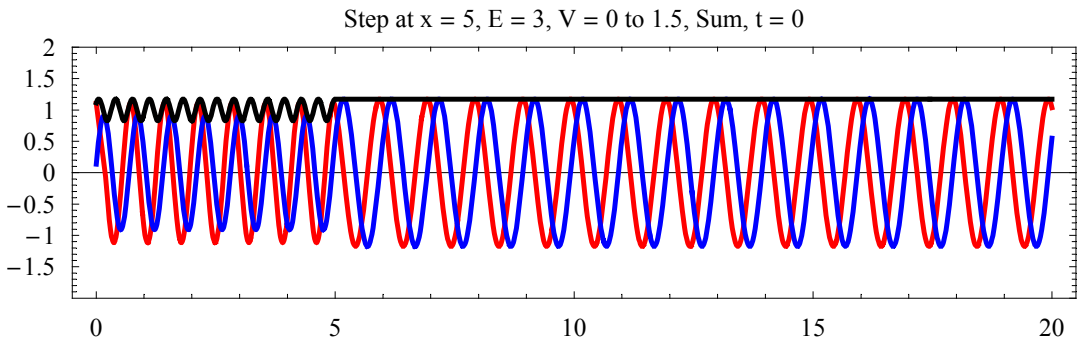
```
(* Step *)

Quit[]

Off[General::spell1];
ψ1I = Exp[i k1 x];
ψ1R = BB Exp[-i k1 x];
ψ1 = ψ1I + ψ1R;
ψ2 = CC Exp[i k2 x];
ψ = Piecewise[{{ψ1, x < x1}, {ψ2, x1 ≤ x}}];
eqns = {ψ1 == ψ2 /. x → x1, ∂x ψ1 == ∂x ψ2 /. x → x1};

soln =
 {BB, CC} = FullSimplify[{BB, CC} /. Solve[eqns, {BB, CC}], Assumptions → {x1 ∈ Reals}][[1]]
```

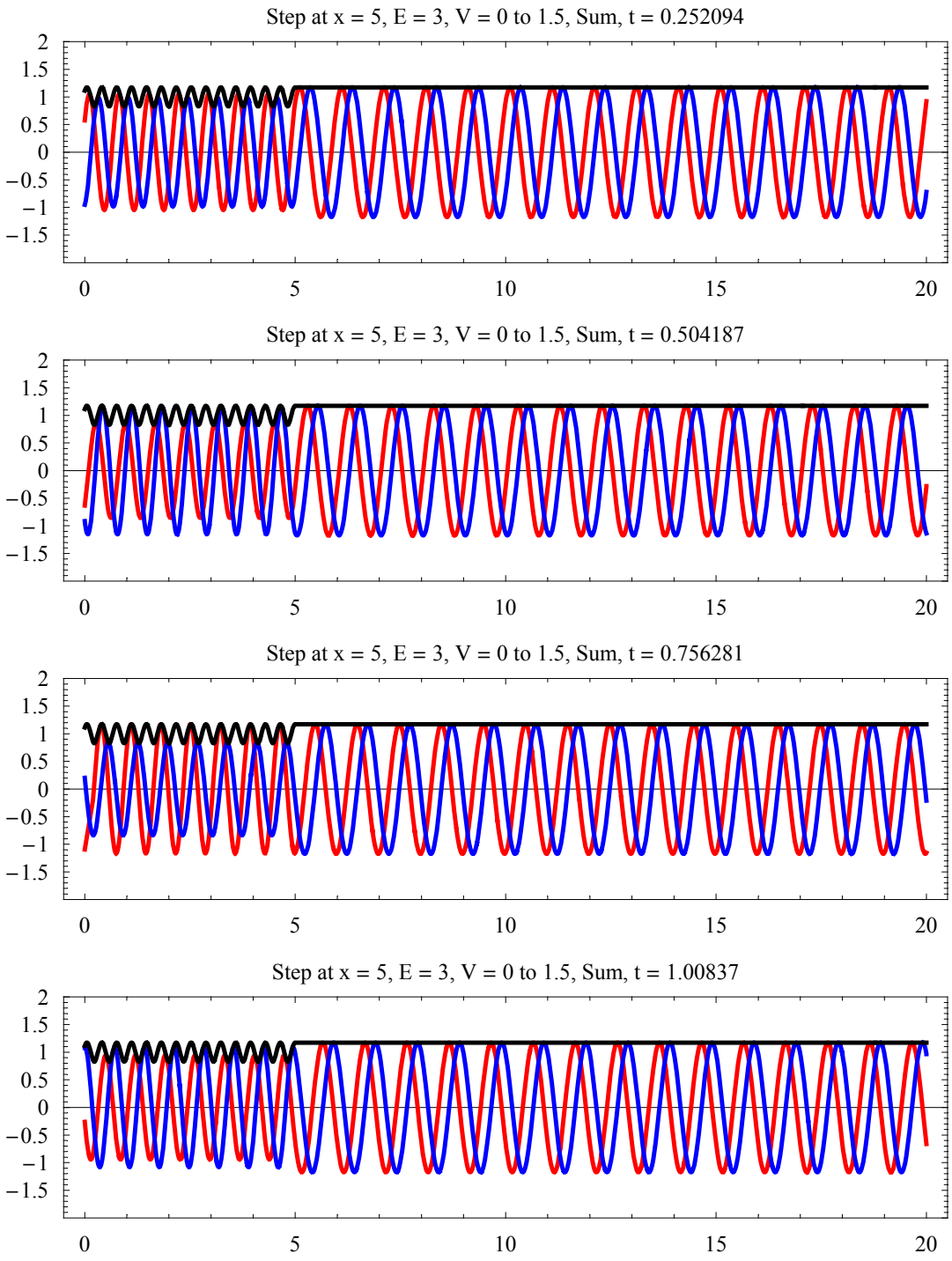
$$\left\{\frac{e^{2\,i\,k1\,x1}\,(k1-k2)}{k1+k2},\ \frac{2\,e^{i\,(k1-k2)\,x1}\,k1}{k1+k2}\right\}$$

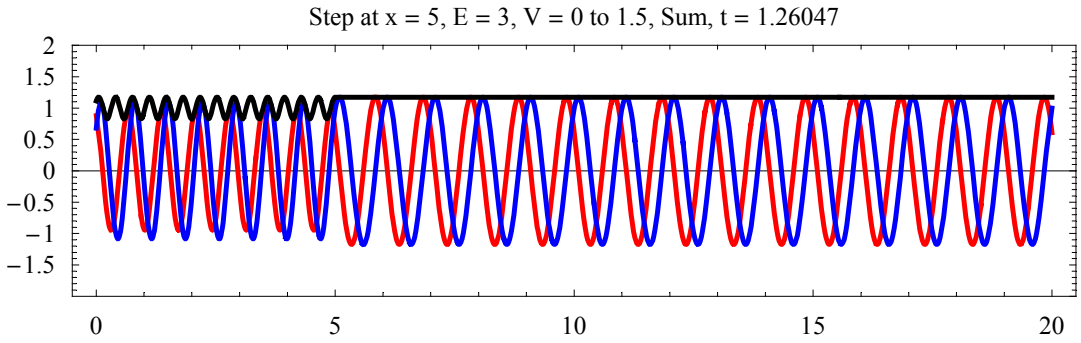
```
CForm[soln]
```

```
List((Power(E,2*I*k1*x1)*(k1 - k2))/(k1 + k2),(2*Power(E,I*(k1 - k2)*x1)*k1)/(k1 +
k2))
```

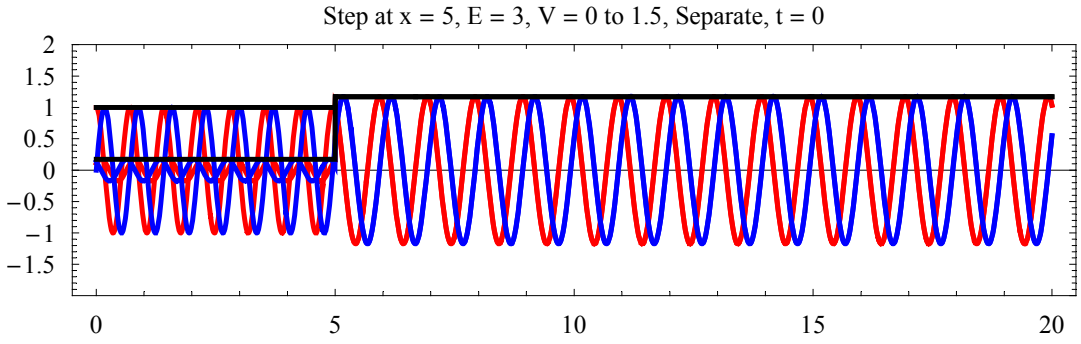
```
EE = 3; (* eV *)
V = 1.5; (* eV *)
m = 0.511 * 10^6 (hbar / 197)^2; (* eV/c^2 *)
hbar = 0.658; (* eV fs *)
k1 = √(2 m EE / hbar^2);
k2 = √(2 m (EE - V) / hbar^2);
period = 2 π hbar / E;
x1 = 5;
$TextStyle = {FontFamily → "Times", FontSize → 12};

movie =
  Table[Plot[{Re[ψ Exp[-i EE t / hbar]], Im[ψ Exp[-i EE t / hbar]], Abs[ψ Exp[-i EE t / hbar]]},
    {x, 0, 20}, PlotRange → {-2, 2}, PlotPoints → 100, PlotStyle →
     {{Thickness[0.005], Red}, {Thickness[0.005], Blue}, {Thickness[0.005], Black}},
    PlotLabel → StringJoin["Step at x = 5, E = 3, V = 0 to 1.5, Sum, t = ",
      ToString[t]], Frame → True, AspectRatio → 1 / 4, ImageSize → 9 * 72,
    PlotPoints → 100], {t, 0, period - (period + 1) / 10, (period + 1) / 10}];
```

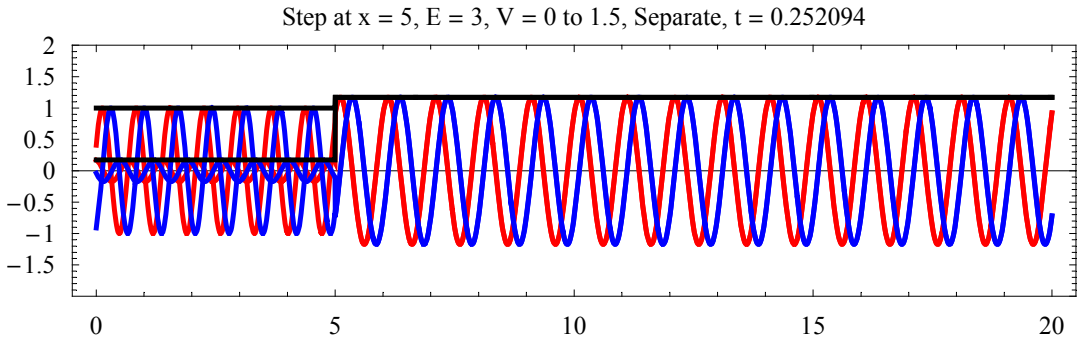


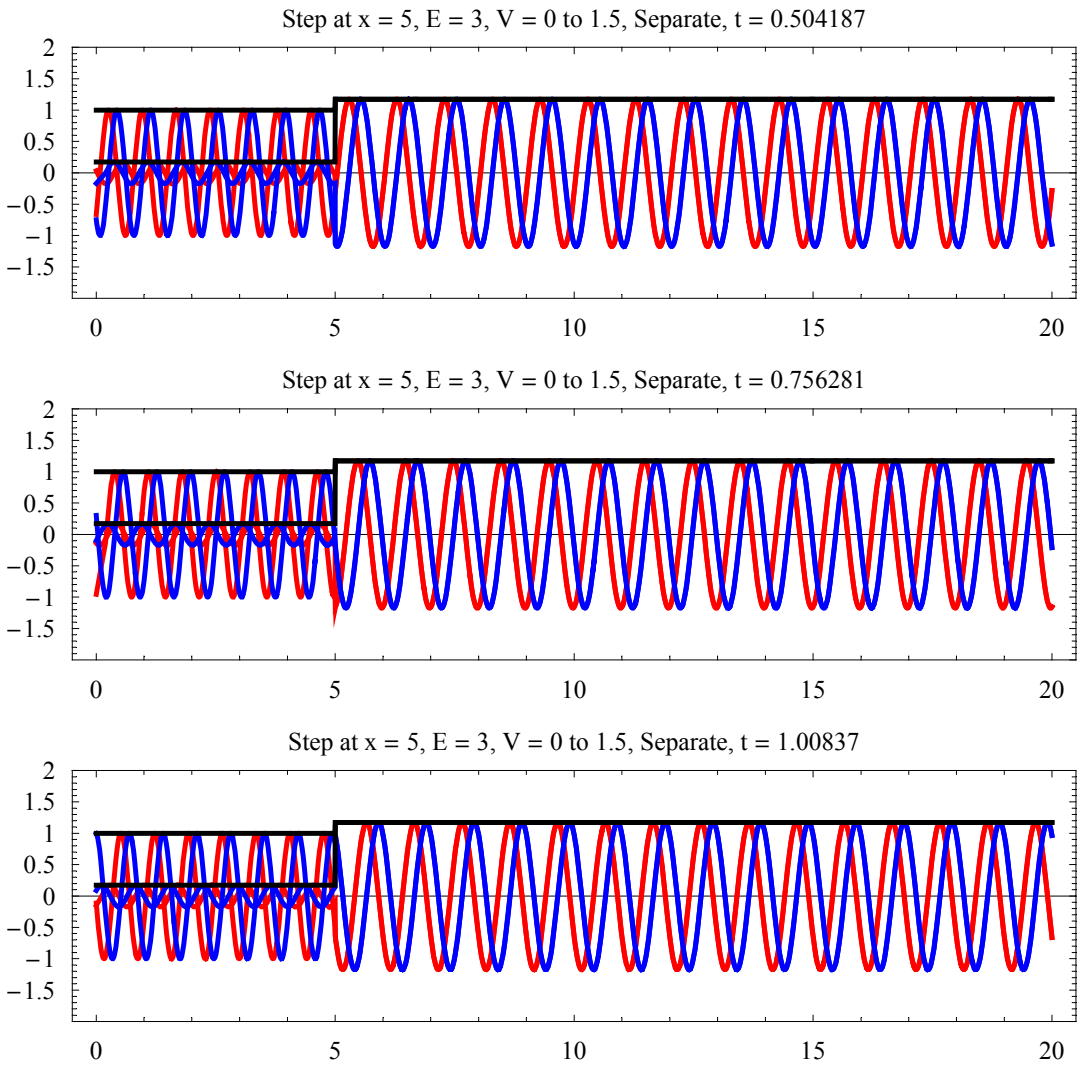

Step at x = 5, E = 3, V = 0 to 1.5, Sum, t = 0.252094
Step at x = 5, E = 3, V = 0 to 1.5, Sum, t = 0.504187
Step at x = 5, E = 3, V = 0 to 1.5, Sum, t = 0.756281
Step at x = 5, E = 3, V = 0 to 1.5, Sum, t = 1.00837
2
1.5
1
0.5
0
−0.5
−1
−1.5
0
5
10
15
20

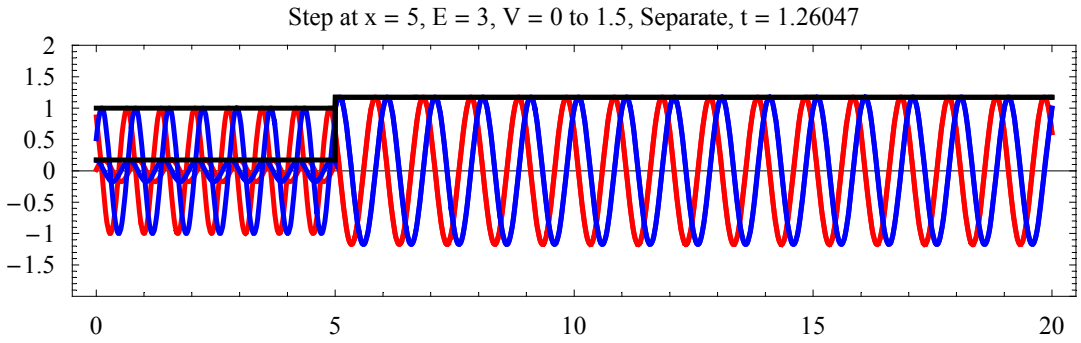



```
movie =
  Table[Plot[Evaluate[{Re[{If[x ≤ x1, ψ1I, ψ2], If[x ≤ x1, ψ1R, ψ2]} Exp[-i EE t / hbar]],
      Im[{If[x ≤ x1, ψ1I, ψ2], If[x ≤ x1, ψ1R, ψ2]} Exp[-i EE t / hbar]],
      Abs[{If[x ≤ x1, ψ1I, ψ2], If[x ≤ x1, ψ1R, ψ2]} Exp[-i EE t / hbar]]}],
    {x, 0, 20}, PlotRange → {-2, 2}, PlotStyle → {{Thickness[0.005], Red},
      {Thickness[0.005], Red}, {Thickness[0.005], Blue}, {Thickness[0.005], Blue},
      {Thickness[0.005], Black}, {Thickness[0.005], Black}}, PlotLabel →
     StringJoin["Step at x = 5, E = 3, V = 0 to 1.5, Separate, t = ", ToString[t]],
    Frame → True, AspectRatio → 1 / 4, ImageSize → 9 * 72, PlotPoints → 100],
   {t, 0, period - (period + 1) / 10, (period + 1) / 10}];
```






Step at x = 5, E = 3, V = 0 to 1.5, Separate, t = 0.504187
Step at x = 5, E = 3, V = 0 to 1.5, Separate, t = 0.756281
Step at x = 5, E = 3, V = 0 to 1.5, Separate, t = 1.00837
2
1.5
1
0.5
0
−0.5
−1
−1.5
0
5
10
15
20




```
(* barrier *)
```

In[1]:=
```
Quit[]
```

In[1]:=
```
Off[General::spell1];
ψ1I = Exp[i k1 x];
ψ1R = BB Exp[-i k1 x];
ψ1 = ψ1I + ψ1R;
ψ2I = CC Exp[i k2 x];
ψ2R = DD Exp[-i k2 x];
ψ2 = ψ2I + ψ2R;
ψ3 = FF Exp[i k3 x];
ψ = Piecewise[{{ψ1, x < x1}, {ψ2, x1 ≤ x < x2}, {ψ3, x ≥ x2}}];
eqns =
  {ψ1 == ψ2 /. x → x1, ψ2 == ψ3 /. x → x2, ∂x ψ1 == ∂x ψ2 /. x → x1, ∂x ψ2 == ∂x ψ3 /. x → x2};
```

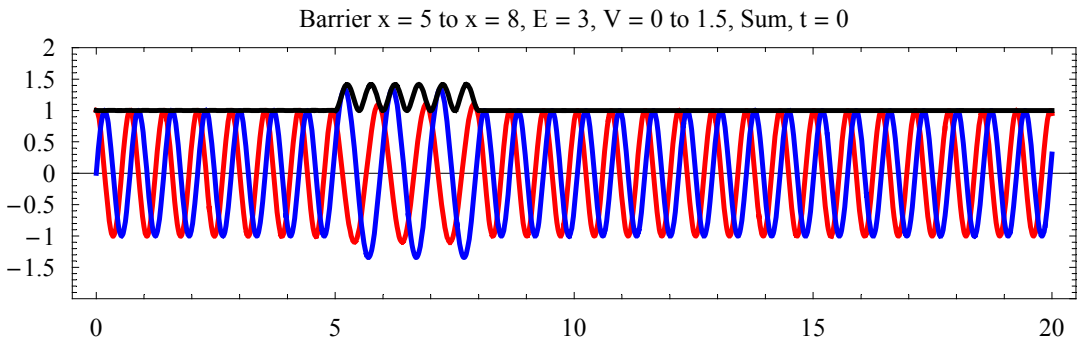
In[11]:=
```
soln = {BB, CC, DD, FF} = FullSimplify[{BB, CC, DD, FF} /. Solve[eqns, {BB, CC, DD, FF}],
    Assumptions → {x1 ∈ Reals, x2 ∈ Reals}][[1]]
```

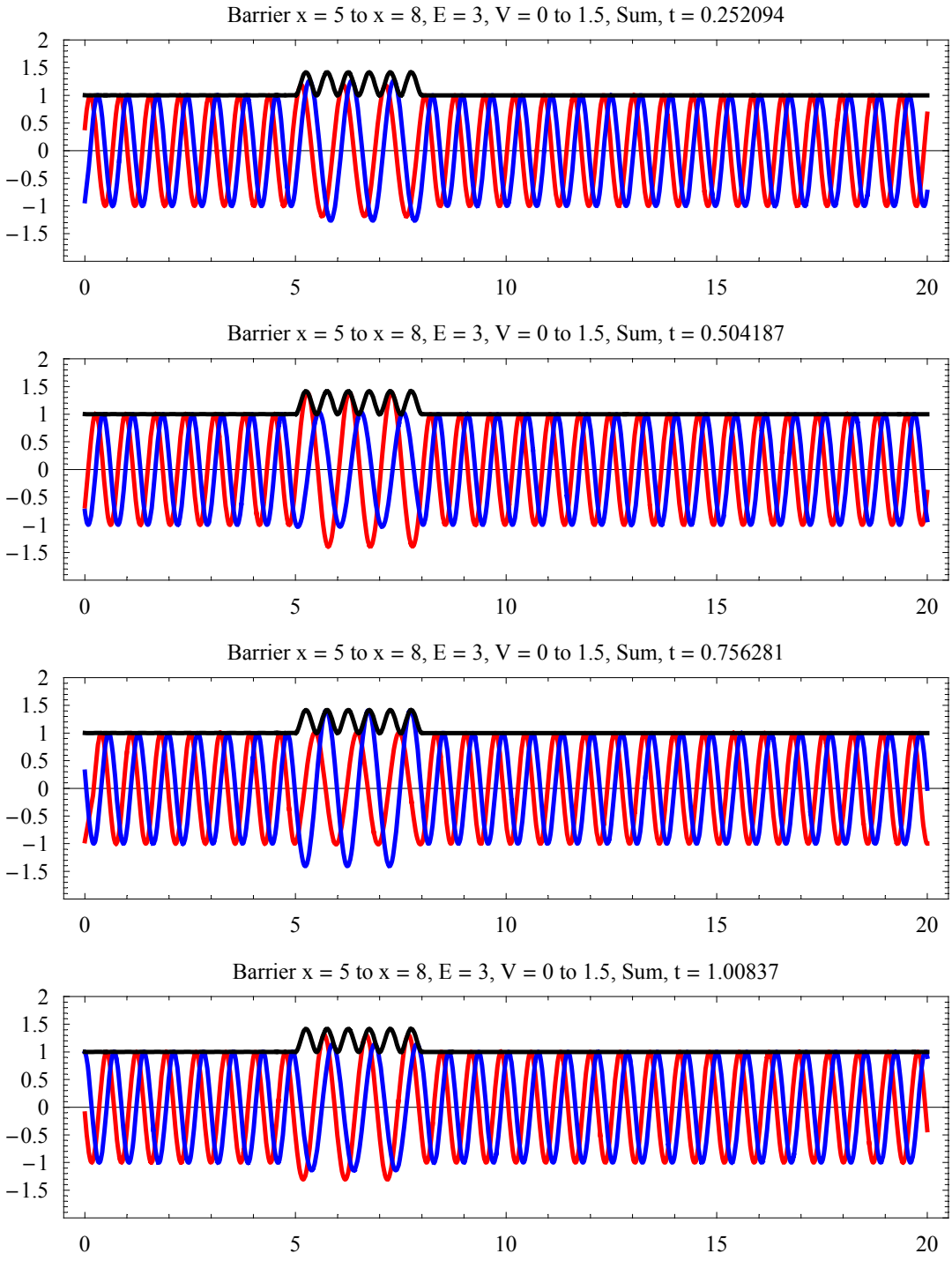
Out[11]=
$$\left\{\frac{e^{2 i k1 x1}\left(e^{2 i k2 x2}(k1+k2)(k2-k3)-e^{2 i k2 x1}(-k1+k2)(k2+k3)\right)}{-e^{2 i k2 x2}(-k1+k2)(k2-k3)+e^{2 i k2 x1}(k1+k2)(k2+k3)},\right.$$
$$\frac{2 e^{i (k1+k2) x1} k1 (k2+k3)}{-e^{2 i k2 x2}(-k1+k2)(k2-k3)+e^{2 i k2 x1}(k1+k2)(k2+k3)},$$
$$\frac{2 e^{i ((k1+k2) x1+2 k2 x2)} k1 (k2-k3)}{-e^{2 i k2 x2}(-k1+k2)(k2-k3)+e^{2 i k2 x1}(k1+k2)(k2+k3)},$$
$$\left.\frac{4 e^{i (k1 x1-k3 x2+k2 (x1+x2))} k1 k2}{-e^{2 i k2 x2}(-k1+k2)(k2-k3)+e^{2 i k2 x1}(k1+k2)(k2+k3)}\right\}$$

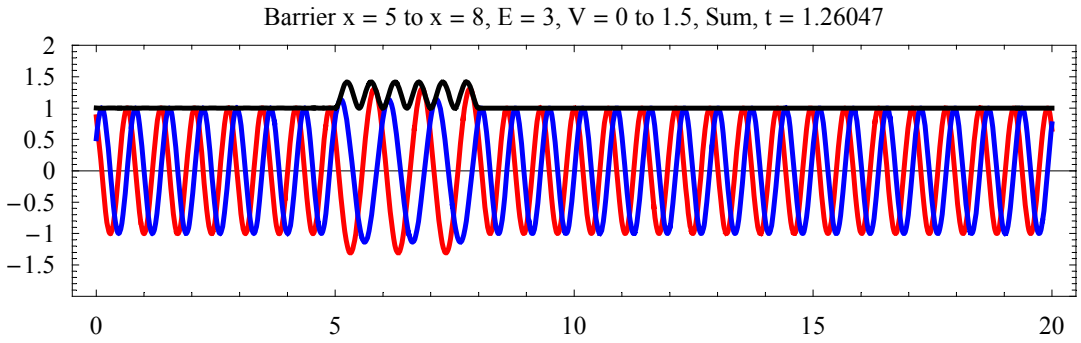
```
CForm[soln]
```

```
List((Power(E,2*I*k1*x1)*(Power(E,2*I*k2*x2)*(k1 + k2)*(k2 - k3) -
Power(E,2*I*k2*x1)*(-k1 + k2)*(k2 + k3)))/
    (-(Power(E,2*I*k2*x2)*(-k1 + k2)*(k2 - k3)) + Power(E,2*I*k2*x1)*(k1 + k2)*(k2 +
k3)),
   (2*Power(E,I*(k1 + k2)*x1)*k1*(k2 + k3))/
    (-(Power(E,2*I*k2*x2)*(-k1 + k2)*(k2 - k3)) + Power(E,2*I*k2*x1)*(k1 + k2)*(k2 +
k3)),
   (2*Power(E,I*((k1 + k2)*x1 + 2*k2*x2))*k1*(k2 - k3))/
    (-(Power(E,2*I*k2*x2)*(-k1 + k2)*(k2 - k3)) + Power(E,2*I*k2*x1)*(k1 + k2)*(k2 +
k3)),
   (4*Power(E,I*(k1*x1 - k3*x2 + k2*(x1 + x2)))*k1*k2)/
    (-(Power(E,2*I*k2*x2)*(-k1 + k2)*(k2 - k3)) + Power(E,2*I*k2*x1)*(k1 + k2)*(k2 +
k3)))
```

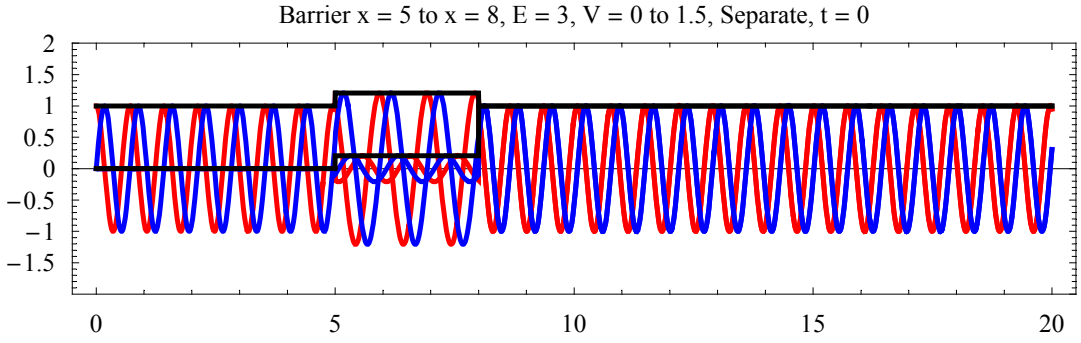
```
(* E > V *)

EE = 3; (* eV *)
V1 = V3 = 0; (* eV *)
V2 = 1.5;
L = 2;
m = 0.511 * 10^6 (hbar / 197)^2; (* eV/c^2 *)
hbar = 0.658; (* eV fs *)
k1 = √(2 m (EE - V1) / hbar^2) ;
k3 = √(2 m (EE - V3) / hbar^2) ;
k2 = √(2 m (EE - V2) / hbar^2) ;
period = 2 π hbar / E;
x1 = 5;
x2 = 8;
$TextStyle = {FontFamily → "Times", FontSize → 12};

movie =
  Table[Plot[{Re[ψ Exp[-i EE t / hbar]], Im[ψ Exp[-i EE t / hbar]], Abs[ψ Exp[-i EE t / hbar]]},
    {x, 0, 20}, PlotRange → {-2, 2}, PlotPoints → 100, PlotStyle →
     {{Thickness[0.005], Red}, {Thickness[0.005], Blue}, {Thickness[0.005], Black}},
    PlotLabel → StringJoin["Barrier x = 5 to x = 8, E = 3, V = 0 to 1.5, Sum, t = ",
      ToString[t]], Frame → True, AspectRatio → 1 / 4, ImageSize → 9 * 72,
    PlotPoints → 100], {t, 0, period - (period + 1) / 10, (period + 1) / 10}];
```

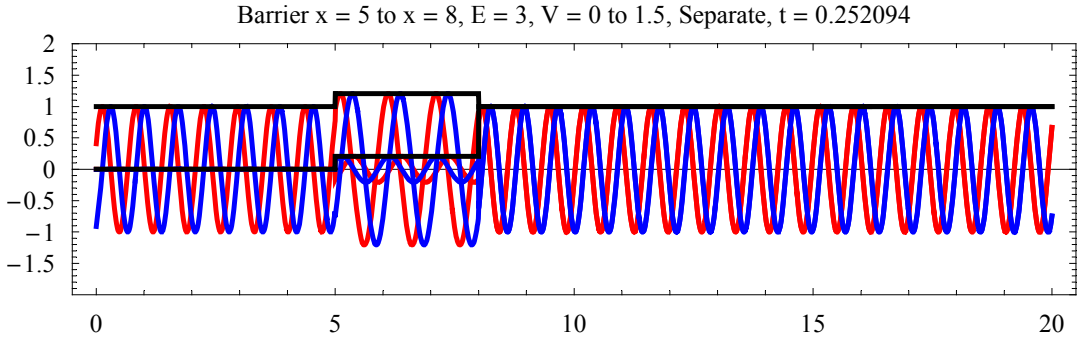


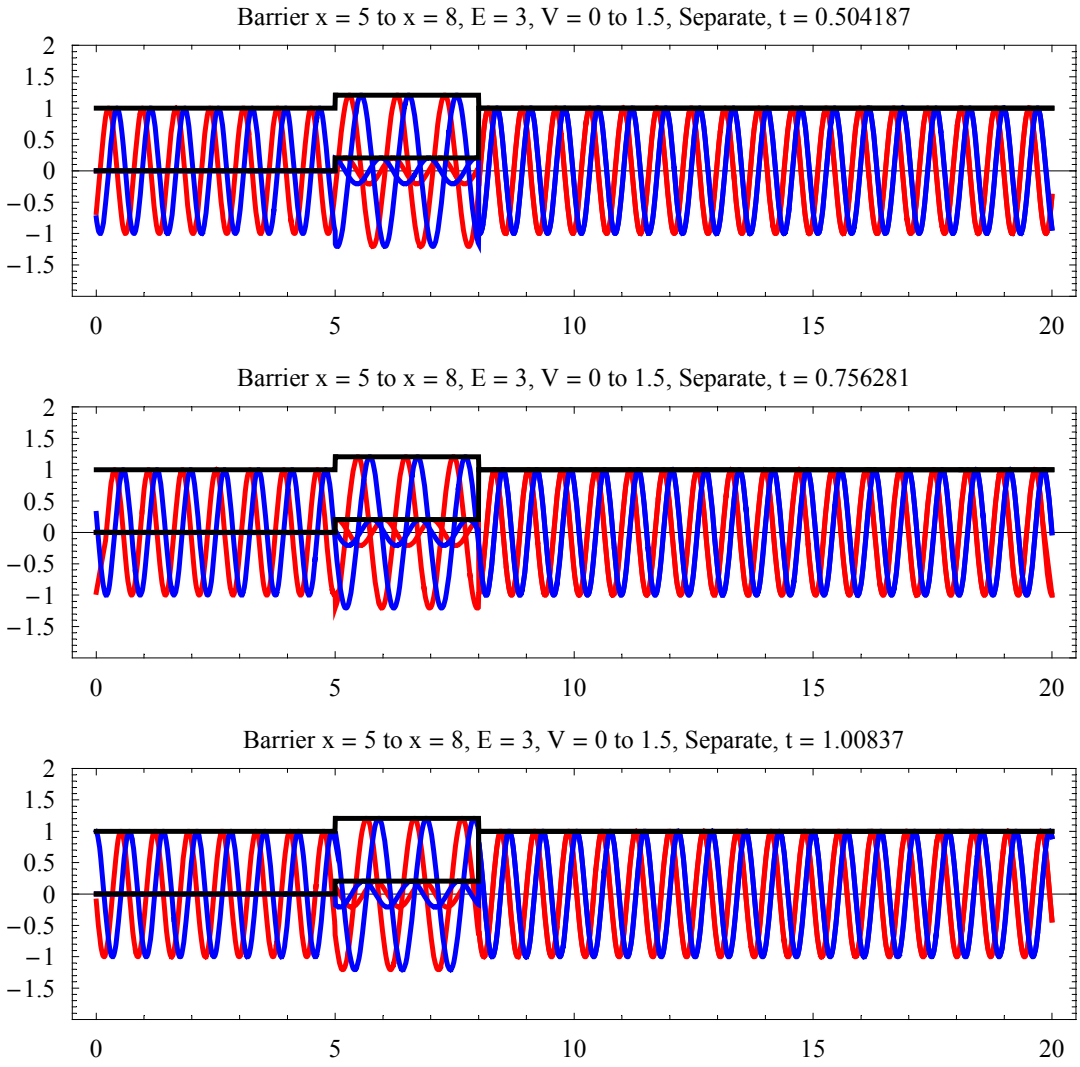

Barrier x = 5 to x = 8, E = 3, V = 0 to 1.5, Sum, t = 0.252094
Barrier x = 5 to x = 8, E = 3, V = 0 to 1.5, Sum, t = 0.504187
Barrier x = 5 to x = 8, E = 3, V = 0 to 1.5, Sum, t = 0.756281
Barrier x = 5 to x = 8, E = 3, V = 0 to 1.5, Sum, t = 1.00837
2
1.5
1
0.5
0
−0.5
−1
−1.5
0
5
10
15
20

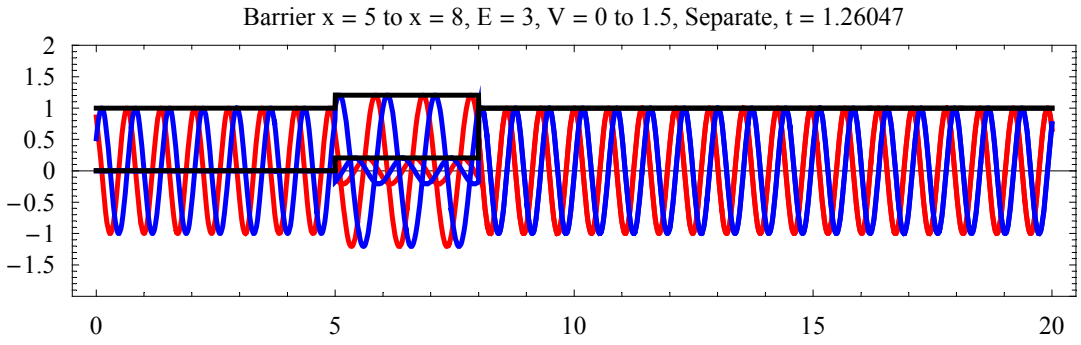



```
movie = Table[Plot[
    Evaluate[{Re[{If[x ≤ x1, ψ1I, If[x ≤ x2, ψ2I, ψ3]], If[x ≤ x1, ψ1R, If[x ≤ x2, ψ2R, ψ3]]}
        Exp[-i EE t / hbar]], Im[{If[x ≤ x1, ψ1I, If[x ≤ x2, ψ2I, ψ3]],
         If[x ≤ x1, ψ1R, If[x ≤ x2, ψ2R, ψ3]]} Exp[-i EE t / hbar]],
      Abs[{If[x ≤ x1, ψ1I, If[x ≤ x2, ψ2I, ψ3]], If[x ≤ x1, ψ1R, If[x ≤ x2, ψ2R, ψ3]]}
        Exp[-i EE t / hbar]]}], {x, 0, 20}, PlotRange → {-2, 2},
    PlotStyle → {{Thickness[0.005], Red}, {Thickness[0.005], Red},
      {Thickness[0.005], Blue}, {Thickness[0.005], Blue},
      {Thickness[0.005], Black}, {Thickness[0.005], Black}}, PlotLabel → StringJoin[
      "Barrier x = 5 to x = 8, E = 3, V = 0 to 1.5, Separate, t = ", ToString[t]],
    Frame → True, AspectRatio → 1 / 4, ImageSize → 9 * 72, PlotPoints → 100],
   {t, 0, period - (period + 1) / 10, (period + 1) / 10}];
```





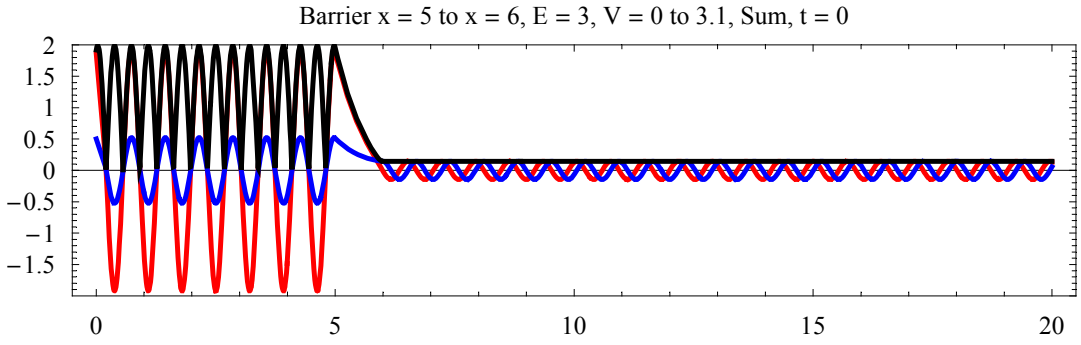

Barrier x = 5 to x = 8, E = 3, V = 0 to 1.5, Separate, t = 0.504187
Barrier x = 5 to x = 8, E = 3, V = 0 to 1.5, Separate, t = 0.756281
Barrier x = 5 to x = 8, E = 3, V = 0 to 1.5, Separate, t = 1.00837
2
1.5
1
0.5
0
−0.5
−1
−1.5
0
5
10
15
20

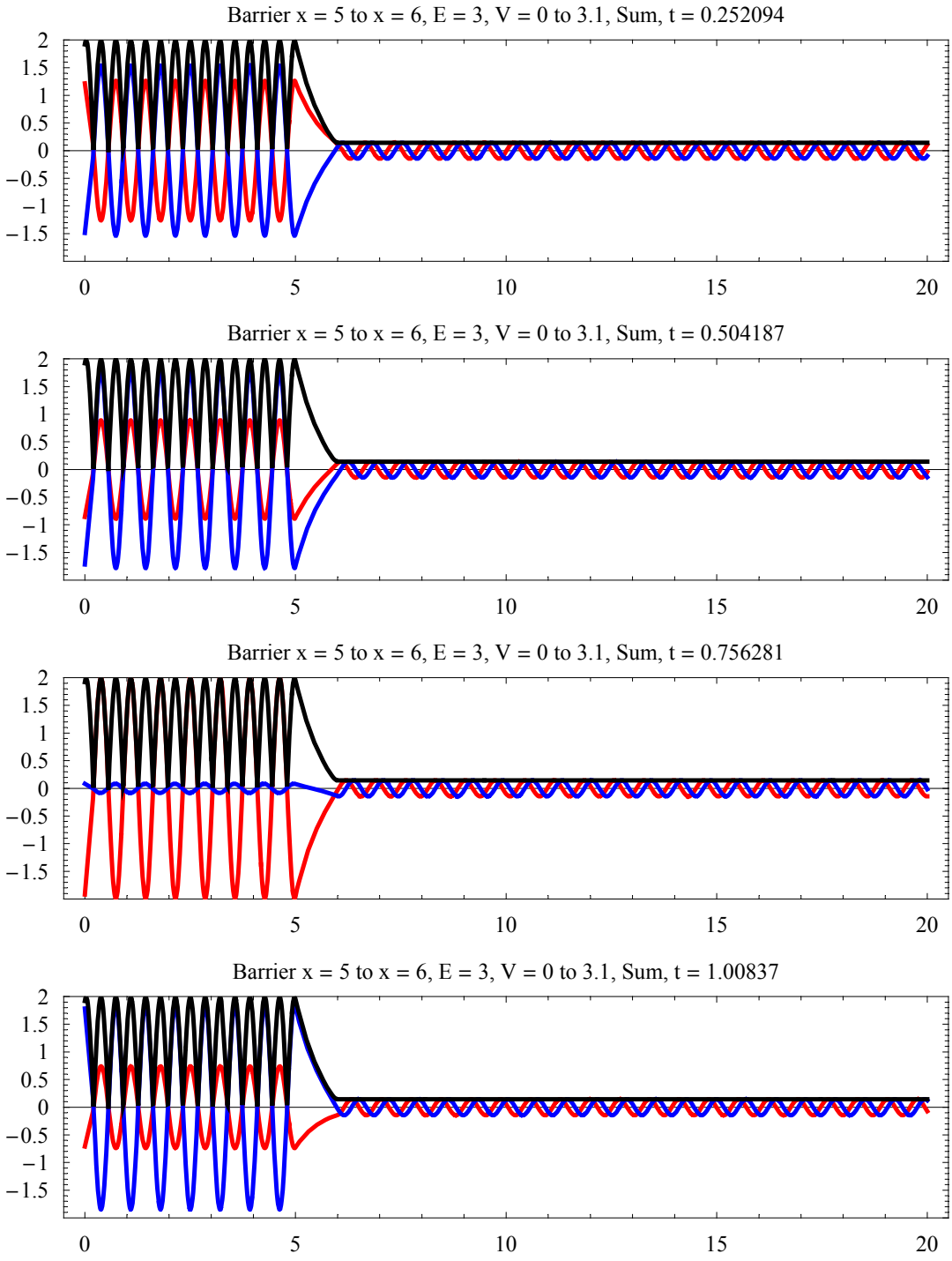


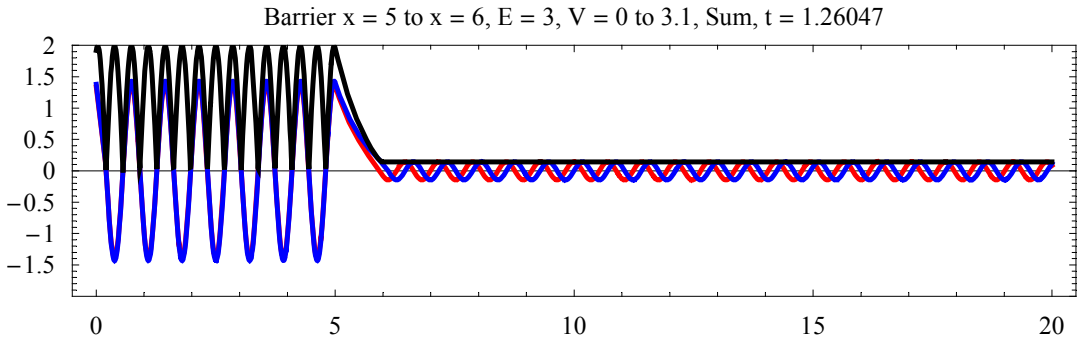

```
(* E < V *)
```

In[22]:=
```
EE = 3; (* eV *)
V1 = V3 = 0; (* eV *)
V2 = 3.1;
m = 0.511 * 10^6 (hbar / 197)^2; (* eV/c^2 *)
hbar = 0.658; (* eV fs *)
k1 = Sqrt[2 m (EE - V1) / hbar^2];
k3 = Sqrt[2 m (EE - V3) / hbar^2];
k2 = Sqrt[2 m (EE - V2) / hbar^2];
period = 2 π hbar / E;
x1 = 5;
x2 = 6;
$TextStyle = {FontFamily → "Times", FontSize → 12};
```

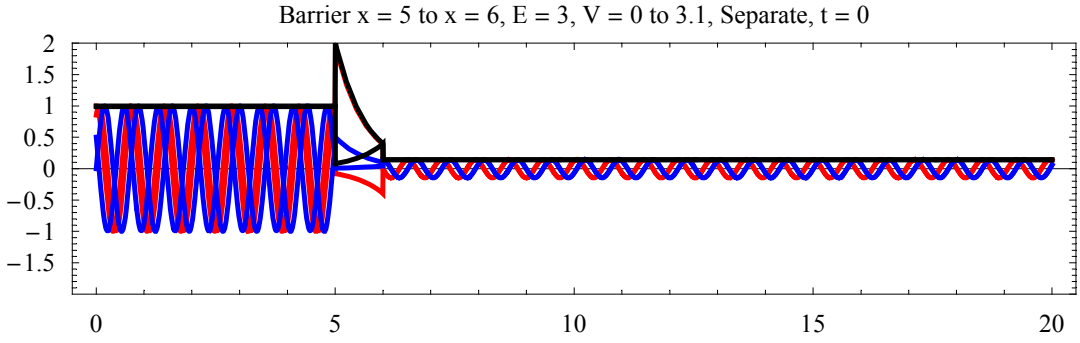
In[31]:=
```
movie = Table[
   Plot[{Re[ψ Exp[-i EE t / hbar]], Im[ψ Exp[-i EE t / hbar]], Abs[ψ Exp[-i EE t / hbar]]}, {x,
     0, 20}, PlotRange → {-2, 2}, PlotPoints → 100, PlotStyle → {{Thickness[0.005], Red},
      {Thickness[0.005], Blue}, {Thickness[0.005], Black}}, PlotLabel → StringJoin[
      "Barrier x = 5 to x = 6, E = 3, V = 0 to 3.1, Sum, t = ", ToString[t]],
    Frame → True, AspectRatio → 1 / 4, ImageSize → 9 * 72, PlotPoints → 100],
   {t, 0, period - (period + 1) / 10, (period + 1) / 10}];
```

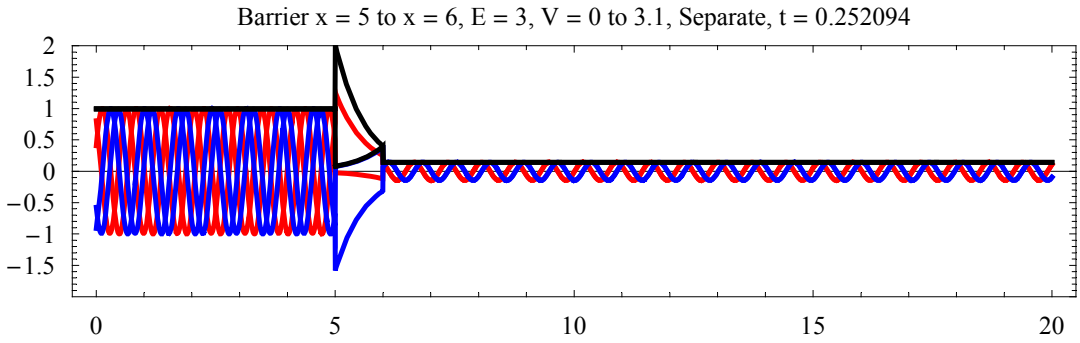


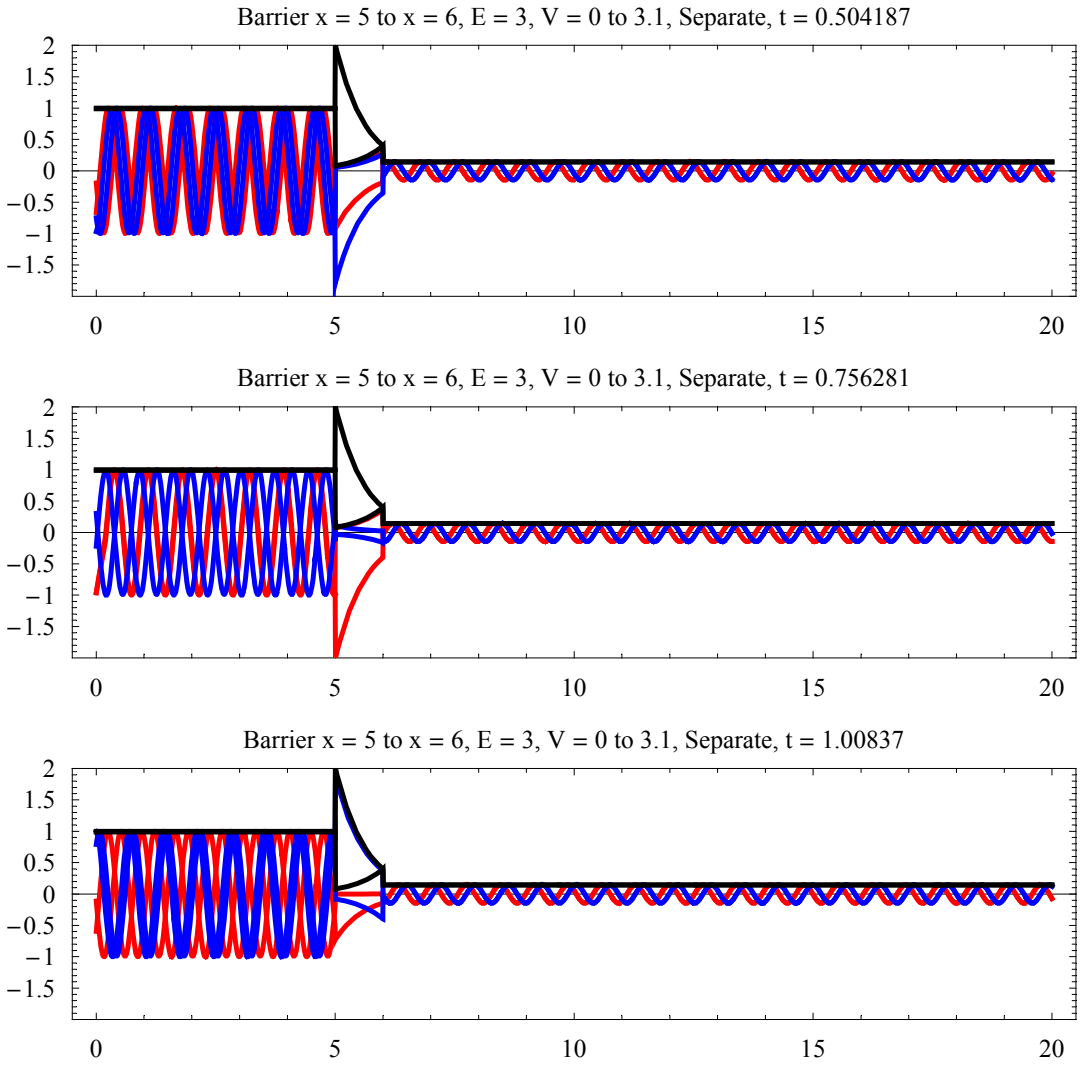

Barrier x = 5 to x = 6, E = 3, V = 0 to 3.1, Sum, t = 0.252094
Barrier x = 5 to x = 6, E = 3, V = 0 to 3.1, Sum, t = 0.504187
Barrier x = 5 to x = 6, E = 3, V = 0 to 3.1, Sum, t = 0.756281
Barrier x = 5 to x = 6, E = 3, V = 0 to 3.1, Sum, t = 1.00837
2
1.5
1
0.5
0
−0.5
−1
−1.5
0
5
10
15
20

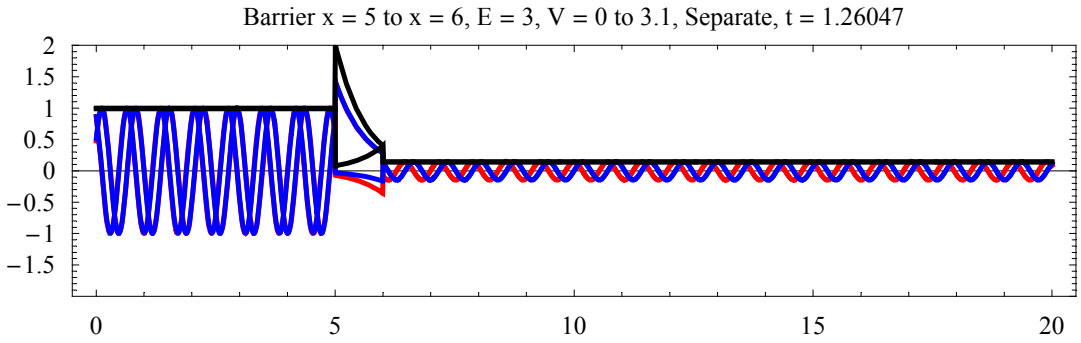


In[32]:=
```
movie = Table[Plot[Evaluate[
    {Re[{If[x ≤ x1, ψ1I, If[x ≤ x2, ψ2I, ψ3]], If[x ≤ x1, ψ1R, If[x ≤ x2, ψ2R, ψ3]]}
       Exp[-i EE t / hbar]], Im[{If[x ≤ x1, ψ1I, If[x ≤ x2, ψ2I, ψ3]],
        If[x ≤ x1, ψ1R, If[x ≤ x2, ψ2R, ψ3]]} Exp[-i EE t / hbar]],
     Abs[{If[x ≤ x1, ψ1I, If[x ≤ x2, ψ2I, ψ3]], If[x ≤ x1, ψ1R, If[x ≤ x2, ψ2R, ψ3]]}
       Exp[-i EE t / hbar]]}], {x, 0, 20}, PlotRange → {-2, 2},
   PlotStyle → {{Thickness[0.005], Red}, {Thickness[0.005], Red},
     {Thickness[0.005], Blue}, {Thickness[0.005], Blue},
     {Thickness[0.005], Black}, {Thickness[0.005], Black}}, PlotLabel → StringJoin[
     "Barrier x = 5 to x = 6, E = 3, V = 0 to 3.1, Separate, t = ", ToString[t]],
   Frame → True, AspectRatio → 1 / 4, ImageSize → 9 * 72, PlotPoints → 100],
  {t, 0, period - (period + 1) / 10, (period + 1) / 10}];
```






Barrier x = 5 to x = 6, E = 3, V = 0 to 3.1, Separate, t = 0.504187
Barrier x = 5 to x = 6, E = 3, V = 0 to 3.1, Separate, t = 0.756281
Barrier x = 5 to x = 6, E = 3, V = 0 to 3.1, Separate, t = 1.00837
2
1.5
1
0.5
0
−0.5
−1
−1.5
0
5
10
15
20




```
(* Double barrier *)

Quit[]

Off[General::spell1];
ψ1I = Exp[i k1 x];
ψ1R = BB Exp[-i k1 x];
ψ1 = ψ1I + ψ1R;
ψ2I = CC Exp[i k2 x];
ψ2R = DD Exp[-i k2 x];
ψ2 = ψ2I + ψ2R;
ψ3I = FF Exp[i k3 x];
ψ3R = GG Exp[-i k3 x];
ψ3 = ψ3I + ψ3R;
ψ4I = HH Exp[i k4 x];
ψ4R = II Exp[-i k4 x];
ψ4 = ψ4I + ψ4R;
ψ5 = JJ Exp[i k5 x];
ψ = Piecewise[
    {{ψ1, x < x1}, {ψ2, x1 ≤ x < x2}, {ψ3, x2 ≤ x < x3}, {ψ4, x3 ≤ x < x4}, {ψ5, x ≥ x4}}];
eqns = {ψ1 == ψ2 /. x → x1, ψ2 == ψ3 /. x → x2, ψ3 == ψ4 /. x → x3,
    ψ4 == ψ5 /. x → x4, ∂x ψ1 == ∂x ψ2 /. x → x1, ∂x ψ2 == ∂x ψ3 /. x → x2,
    ∂x ψ3 == ∂x ψ4 /. x → x3, ∂x ψ4 == ∂x ψ5 /. x → x4};

soln = {BB, CC, DD, FF, GG, HH, II, JJ} = FullSimplify[
     {BB, CC, DD, FF, GG, HH, II, JJ} /. Solve[eqns, {BB, CC, DD, FF, GG, HH, II, JJ}],
     Assumptions → {x1 ∈ Reals, x2 ∈ Reals, x3 ∈ Reals, x4 ∈ Reals}][[1]]
```

$$\{(e^{2 i k1 x1} (e^{2 i ((k2+k3) x2+k4 x4)} (k1+k2) (k2-k3) (k3-k4) (k4-k5) - e^{2 i (k2 x1+k3 x2+k4 x4)} (-k1+k2) (k2+k3) (k3-k4) (k4-k5) - e^{2 i (k2 x1+k3 x3+k4 x4)} (-k1+k2) (k2-k3) (k3+k4) (k4-k5) + e^{2 i (k2 x2+k3 x3+k4 x4)} (k1+k2) (k2+k3) (k3+k4) (k4-k5) - e^{2 i (k2 x1+(k3+k4) x3)} (-k1+k2) (k2-k3) (k3-k4) (k4+k5) + e^{2 i (k2 x2+(k3+k4) x3)} (k1+k2) (k2+k3) (k3-k4) (k4+k5) + e^{2 i ((k2+k3) x2+k4 x3)} (k1+k2) (k2-k3) (k3+k4) (k4+k5) - e^{2 i (k2 x1+k3 x2+k4 x3)} (-k1+k2) (k2+k3) (k3+k4) (k4+k5))) / (-e^{2 i ((k2+k3) x2+k4 x4)} (-k1+k2) (k2-k3) (k3-k4) (k4-k5) + e^{2 i (k2 x1+k3 x2+k4 x4)} (k1+k2) (k2+k3) (k3-k4) (k4-k5) + e^{2 i (k2 x1+k3 x3+k4 x4)} (k1+k2) (k2-k3) (k3+k4) (k4-k5) - e^{2 i (k2 x2+k3 x3+k4 x4)} (-k1+k2) (k2+k3) (k3+k4) (k4-k5) + e^{2 i (k2 x1+(k3+k4) x3)} (k1+k2) (k2-k3) (k3-k4) (k4+k5) - e^{2 i (k2 x2+(k3+k4) x3)} (-k1+k2) (k2+k3) (k3-k4) (k4+k5) - e^{2 i ((k2+k3) x2+k4 x3)} (-k1+k2) (k2-k3) (k3+k4) (k4+k5) +$$

```
    e^(2 i (k2 x1+k3 x2+k4 x3)) (k1 + k2) (k2 + k3) (k3 + k4) (k4 + k5)), (2 e^(i (k1+k2) x1 k1
    (e^(2 i (k3 x2+k4 x4)) (k2 + k3) (k3 - k4) (k4 - k5) - e^(2 i (k3 x3+k4 x4)) (-k2 + k3) (k3 + k4) (k4 - k5) -
      e^(2 i (k3+k4) x3) (-k2 + k3) (k3 - k4) (k4 + k5) + e^(2 i (k3 x2+k4 x3)) (k2 + k3) (k3 + k4) (k4 + k5))) /
 (-e^(2 i ((k2+k3) x2+k4 x4)) (-k1 + k2) (k2 - k3) (k3 - k4) (k4 - k5) +
    e^(2 i (k2 x1+k3 x2+k4 x4)) (k1 + k2) (k2 + k3) (k3 - k4) (k4 - k5) +
    e^(2 i (k2 x1+k3 x3+k4 x4)) (k1 + k2) (k2 - k3) (k3 + k4) (k4 - k5) -
    e^(2 i (k2 x2+k3 x3+k4 x4)) (-k1 + k2) (k2 + k3) (k3 + k4) (k4 - k5) +
    e^(2 i (k2 x1+(k3+k4) x3)) (k1 + k2) (k2 - k3) (k3 - k4) (k4 + k5) -
    e^(2 i (k2 x2+(k3+k4) x3)) (-k1 + k2) (k2 + k3) (k3 - k4) (k4 + k5) -
    e^(2 i ((k2+k3) x2+k4 x3)) (-k1 + k2) (k2 - k3) (k3 + k4) (k4 + k5) +
    e^(2 i (k2 x1+k3 x2+k4 x3)) (k1 + k2) (k2 + k3) (k3 + k4) (k4 + k5)),
-(2 e^(i ((k1+k2) x1+2 k2 x2)) k1 (-e^(2 i (k3 x2+k4 x4)) (-k2 + k3) (k3 - k4) (k4 - k5) +
      e^(2 i (k3 x3+k4 x4)) (k2 + k3) (k3 + k4) (k4 - k5) + e^(2 i (k3+k4) x3) (k2 + k3) (k3 - k4) (k4 + k5) -
      e^(2 i (k3 x2+k4 x3)) (-k2 + k3) (k3 + k4) (k4 + k5))) /
  (e^(2 i ((k2+k3) x2+k4 x4)) (-k1 + k2) (k2 - k3) (k3 - k4) (k4 - k5) - e^(2 i (k2 x1+k3 x2+k4 x4)) (k1 + k2)
     (k2 + k3) (k3 - k4) (k4 - k5) - e^(2 i (k2 x1+k3 x3+k4 x4)) (k1 + k2) (k2 - k3) (k3 + k4) (k4 - k5) +
    e^(2 i (k2 x2+k3 x3+k4 x4)) (-k1 + k2) (k2 + k3) (k3 + k4) (k4 - k5) -
    e^(2 i (k2 x1+(k3+k4) x3)) (k1 + k2) (k2 - k3) (k3 - k4) (k4 + k5) +
    e^(2 i (k2 x2+(k3+k4) x3)) (-k1 + k2) (k2 + k3) (k3 - k4) (k4 + k5) + e^(2 i ((k2+k3) x2+k4 x3)) (-k1 + k2)
     (k2 - k3) (k3 + k4) (k4 + k5) - e^(2 i (k2 x1+k3 x2+k4 x3)) (k1 + k2) (k2 + k3) (k3 + k4) (k4 + k5)),
(4 e^(i ((k1+k2) x1+(k2+k3) x2)) k1 k2 (-e^(2 i k4 x4) (-k3 + k4) (k4 - k5) + e^(2 i k4 x3) (k3 + k4) (k4 + k5))) /
 (-e^(2 i ((k2+k3) x2+k4 x4)) (-k1 + k2) (k2 - k3) (k3 - k4) (k4 - k5) +
    e^(2 i (k2 x1+k3 x2+k4 x4)) (k1 + k2) (k2 + k3) (k3 - k4) (k4 - k5) +
    e^(2 i (k2 x1+k3 x3+k4 x4)) (k1 + k2) (k2 - k3) (k3 + k4) (k4 - k5) -
    e^(2 i (k2 x2+k3 x3+k4 x4)) (-k1 + k2) (k2 + k3) (k3 + k4) (k4 - k5) +
    e^(2 i (k2 x1+(k3+k4) x3)) (k1 + k2) (k2 - k3) (k3 - k4) (k4 + k5) -
    e^(2 i (k2 x2+(k3+k4) x3)) (-k1 + k2) (k2 + k3) (k3 - k4) (k4 + k5) -
    e^(2 i ((k2+k3) x2+k4 x3)) (-k1 + k2) (k2 - k3) (k3 + k4) (k4 + k5) +
    e^(2 i (k2 x1+k3 x2+k4 x3)) (k1 + k2) (k2 + k3) (k3 + k4) (k4 + k5)),
(4 e^(i (k1 x1+k2 (x1+x2)+k3 (x2+2 x3))) k1 k2 (e^(2 i k4 x4) (k3 + k4) (k4 - k5) - e^(2 i k4 x3) (-k3 + k4) (k4 + k5))) /
 (-e^(2 i ((k2+k3) x2+k4 x4)) (-k1 + k2) (k2 - k3) (k3 - k4) (k4 - k5) +
    e^(2 i (k2 x1+k3 x2+k4 x4)) (k1 + k2) (k2 + k3) (k3 - k4) (k4 - k5) +
    e^(2 i (k2 x1+k3 x3+k4 x4)) (k1 + k2) (k2 - k3) (k3 + k4) (k4 - k5) -
    e^(2 i (k2 x2+k3 x3+k4 x4)) (-k1 + k2) (k2 + k3) (k3 + k4) (k4 - k5) +
    e^(2 i (k2 x1+(k3+k4) x3)) (k1 + k2) (k2 - k3) (k3 - k4) (k4 + k5) -
    e^(2 i (k2 x2+(k3+k4) x3)) (-k1 + k2) (k2 + k3) (k3 - k4) (k4 + k5) -
    e^(2 i ((k2+k3) x2+k4 x3)) (-k1 + k2) (k2 - k3) (k3 + k4) (k4 + k5) +
    e^(2 i (k2 x1+k3 x2+k4 x3)) (k1 + k2) (k2 + k3) (k3 + k4) (k4 + k5)),
(8 e^(i (k1 x1+k3 x2+k2 (x1+x2)+(k3+k4) x3)) k1 k2 k3 (k4 + k5)) /
 (-e^(2 i ((k2+k3) x2+k4 x4)) (-k1 + k2) (k2 - k3) (k3 - k4) (k4 - k5) +
    e^(2 i (k2 x1+k3 x2+k4 x4)) (k1 + k2) (k2 + k3) (k3 - k4) (k4 - k5) +
    e^(2 i (k2 x1+k3 x3+k4 x4)) (k1 + k2) (k2 - k3) (k3 + k4) (k4 - k5) -
    e^(2 i (k2 x2+k3 x3+k4 x4)) (-k1 + k2) (k2 + k3) (k3 + k4) (k4 - k5) +
    e^(2 i (k2 x1+(k3+k4) x3)) (k1 + k2) (k2 - k3) (k3 - k4) (k4 + k5) -
    e^(2 i (k2 x2+(k3+k4) x3)) (-k1 + k2) (k2 + k3) (k3 - k4) (k4 + k5) -
    e^(2 i ((k2+k3) x2+k4 x3)) (-k1 + k2) (k2 - k3) (k3 + k4) (k4 + k5) +
    e^(2 i (k2 x1+k3 x2+k4 x3)) (k1 + k2) (k2 + k3) (k3 + k4) (k4 + k5)),
(8 e^(i (k1 x1+k3 x2+k2 (x1+x2)+k3 x3+k4 x3+2 k4 x4)) k1 k2 k3 (k4 - k5)) /
 (-e^(2 i ((k2+k3) x2+k4 x4)) (-k1 + k2) (k2 - k3) (k3 - k4) (k4 - k5) +
    e^(2 i (k2 x1+k3 x2+k4 x4)) (k1 + k2) (k2 + k3) (k3 - k4) (k4 - k5) +
    e^(2 i (k2 x1+k3 x3+k4 x4)) (k1 + k2) (k2 - k3) (k3 + k4) (k4 - k5) -
```

$$
\begin{aligned}
&e^{2\,i\,(k2\,x2+k3\,x3+k4\,x4)}\,(-k1+k2)\,(k2+k3)\,(k3+k4)\,(k4-k5)+\\
&e^{2\,i\,(k2\,x1+(k3+k4)\,x3)}\,(k1+k2)\,(k2-k3)\,(k3-k4)\,(k4+k5)-\\
&e^{2\,i\,(k2\,x2+(k3+k4)\,x3)}\,(-k1+k2)\,(k2+k3)\,(k3-k4)\,(k4+k5)-\\
&e^{2\,i\,((k2+k3)\,x2+k4\,x3)}\,(-k1+k2)\,(k2-k3)\,(k3+k4)\,(k4+k5)+\\
&e^{2\,i\,(k2\,x1+k3\,x2+k4\,x3)}\,(k1+k2)\,(k2+k3)\,(k3+k4)\,(k4+k5)),\\
&(16\,e^{i\,(k1\,x1+k3\,x2+k2\,(x1+x2)+k3\,x3+k4\,x3+k4\,x4-k5\,x4)}\,k1\,k2\,k3\,k4)\,/\\
&(-e^{2\,i\,((k2+k3)\,x2+k4\,x4)}\,(-k1+k2)\,(k2-k3)\,(k3-k4)\,(k4-k5)+\\
&e^{2\,i\,(k2\,x1+k3\,x2+k4\,x4)}\,(k1+k2)\,(k2+k3)\,(k3-k4)\,(k4-k5)+\\
&e^{2\,i\,(k2\,x1+k3\,x3+k4\,x4)}\,(k1+k2)\,(k2-k3)\,(k3+k4)\,(k4-k5)-\\
&e^{2\,i\,(k2\,x2+k3\,x3+k4\,x4)}\,(-k1+k2)\,(k2+k3)\,(k3+k4)\,(k4-k5)+\\
&e^{2\,i\,(k2\,x1+(k3+k4)\,x3)}\,(k1+k2)\,(k2-k3)\,(k3-k4)\,(k4+k5)-\\
&e^{2\,i\,(k2\,x2+(k3+k4)\,x3)}\,(-k1+k2)\,(k2+k3)\,(k3-k4)\,(k4+k5)-\\
&e^{2\,i\,((k2+k3)\,x2+k4\,x3)}\,(-k1+k2)\,(k2-k3)\,(k3+k4)\,(k4+k5)+\\
&e^{2\,i\,(k2\,x1+k3\,x2+k4\,x3)}\,(k1+k2)\,(k2+k3)\,(k3+k4)\,(k4+k5))\}
\end{aligned}
$$

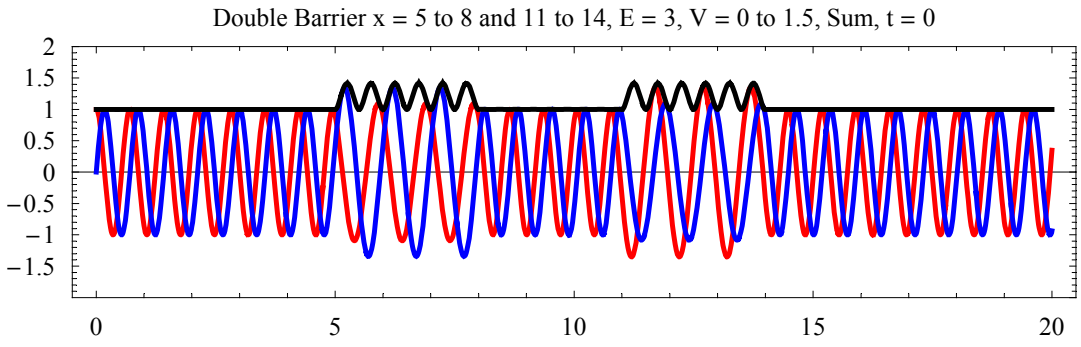
CForm[soln]

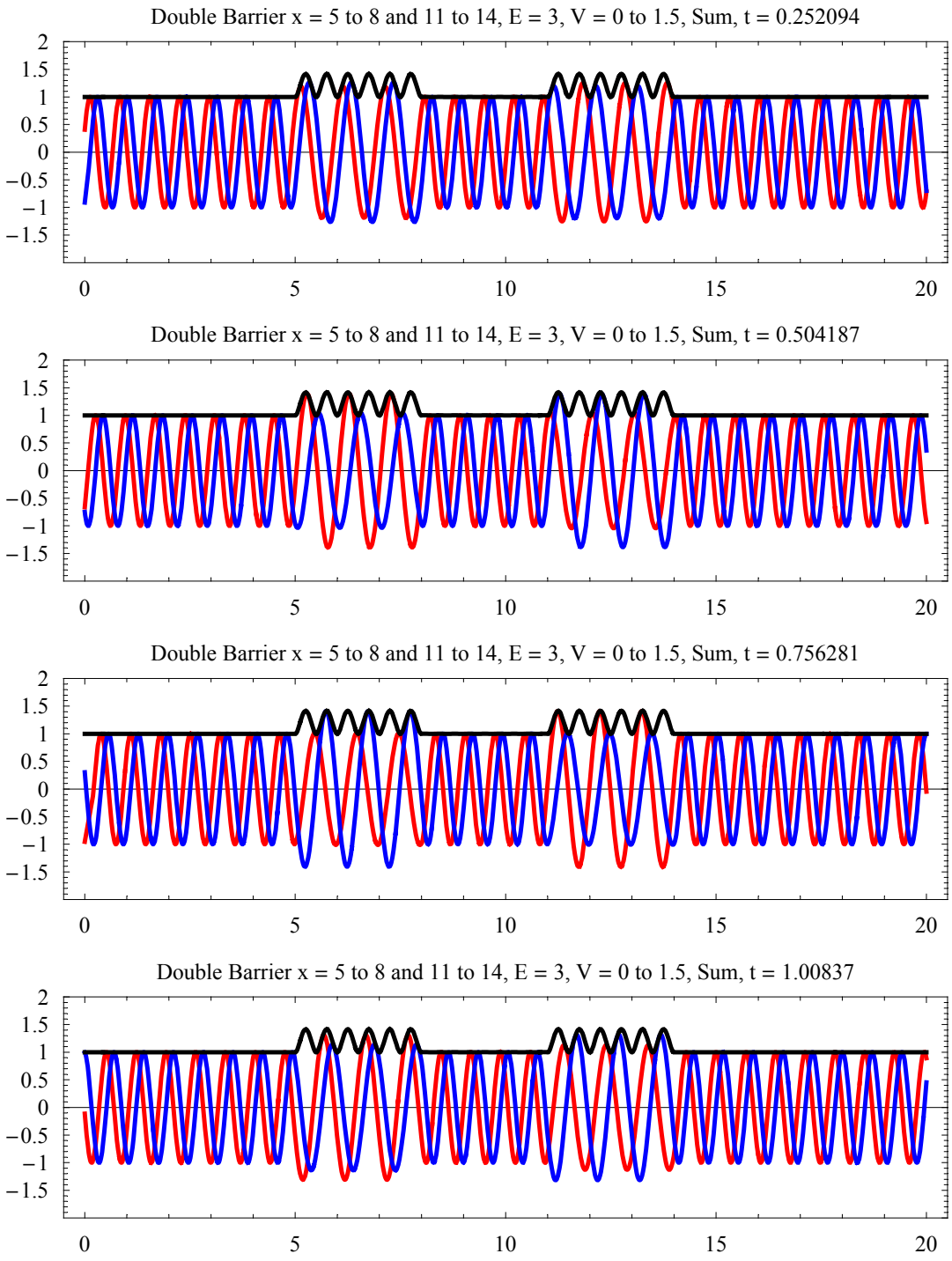
```
List((Power(E,2*I*k1*x1)*(Power(E,2*I*((k2 + k3)*x2 + k4*x4))*(k1 + k2)*(k2 - k3)*(k3
- k4)*(k4 - k5) -
        Power(E,2*I*(k2*x1 + k3*x2 + k4*x4))*(-k1 + k2)*(k2 + k3)*(k3 - k4)*(k4 - k5)
-
        Power(E,2*I*(k2*x1 + k3*x3 + k4*x4))*(-k1 + k2)*(k2 - k3)*(k3 + k4)*(k4 - k5)
+
        Power(E,2*I*(k2*x2 + k3*x3 + k4*x4))*(k1 + k2)*(k2 + k3)*(k3 + k4)*(k4 - k5)
-
        Power(E,2*I*(k2*x1 + (k3 + k4)*x3))*(-k1 + k2)*(k2 - k3)*(k3 - k4)*(k4 + k5)
+
        Power(E,2*I*(k2*x2 + (k3 + k4)*x3))*(k1 + k2)*(k2 + k3)*(k3 - k4)*(k4 + k5) +
        Power(E,2*I*((k2 + k3)*x2 + k4*x3))*(k1 + k2)*(k2 - k3)*(k3 + k4)*(k4 + k5) -
        Power(E,2*I*(k2*x1 + k3*x2 + k4*x3))*(-k1 + k2)*(k2 + k3)*(k3 + k4)*(k4 +
k5)))/
    (-(Power(E,2*I*((k2 + k3)*x2 + k4*x4))*(-k1 + k2)*(k2 - k3)*(k3 - k4)*(k4 - k5))
+
      Power(E,2*I*(k2*x1 + k3*x2 + k4*x4))*(k1 + k2)*(k2 + k3)*(k3 - k4)*(k4 - k5) +
      Power(E,2*I*(k2*x1 + k3*x3 + k4*x4))*(k1 + k2)*(k2 - k3)*(k3 + k4)*(k4 - k5) -
      Power(E,2*I*(k2*x2 + k3*x3 + k4*x4))*(-k1 + k2)*(k2 + k3)*(k3 + k4)*(k4 - k5) +
      Power(E,2*I*(k2*x1 + (k3 + k4)*x3))*(k1 + k2)*(k2 - k3)*(k3 - k4)*(k4 + k5) -
      Power(E,2*I*(k2*x2 + (k3 + k4)*x3))*(-k1 + k2)*(k2 + k3)*(k3 - k4)*(k4 + k5) -
      Power(E,2*I*((k2 + k3)*x2 + k4*x3))*(-k1 + k2)*(k2 - k3)*(k3 + k4)*(k4 + k5) +
      Power(E,2*I*(k2*x1 + k3*x2 + k4*x3))*(k1 + k2)*(k2 + k3)*(k3 + k4)*(k4 + k5)),
   (2*Power(E,I*(k1 + k2)*x1)*k1*(Power(E,2*I*(k3*x2 + k4*x4))*(k2 + k3)*(k3 -
k4)*(k4 - k5) -
        Power(E,2*I*(k3*x3 + k4*x4))*(-k2 + k3)*(k3 + k4)*(k4 - k5) - Power(E,2*I*(k3
+ k4)*x3)*(-k2 + k3)*(k3 - k4)*(k4 + k5) +
        Power(E,2*I*(k3*x2 + k4*x3))*(k2 + k3)*(k3 + k4)*(k4 + k5)))/
    (-(Power(E,2*I*((k2 + k3)*x2 + k4*x4))*(-k1 + k2)*(k2 - k3)*(k3 - k4)*(k4 - k5))
+
      Power(E,2*I*(k2*x1 + k3*x2 + k4*x4))*(k1 + k2)*(k2 + k3)*(k3 - k4)*(k4 - k5) +
      Power(E,2*I*(k2*x1 + k3*x3 + k4*x4))*(k1 + k2)*(k2 - k3)*(k3 + k4)*(k4 - k5) -
      Power(E,2*I*(k2*x2 + k3*x3 + k4*x4))*(-k1 + k2)*(k2 + k3)*(k3 + k4)*(k4 - k5) +
      Power(E,2*I*(k2*x1 + (k3 + k4)*x3))*(k1 + k2)*(k2 - k3)*(k3 - k4)*(k4 + k5) -
      Power(E,2*I*(k2*x2 + (k3 + k4)*x3))*(-k1 + k2)*(k2 + k3)*(k3 - k4)*(k4 + k5) -
      Power(E,2*I*((k2 + k3)*x2 + k4*x3))*(-k1 + k2)*(k2 - k3)*(k3 + k4)*(k4 + k5) +
      Power(E,2*I*(k2*x1 + k3*x2 + k4*x3))*(k1 + k2)*(k2 + k3)*(k3 + k4)*(k4 + k5)),
   (-2*Power(E,I*((k1 + k2)*x1 + 2*k2*x2))*k1*(-(Power(E,2*I*(k3*x2 + k4*x4))*(-k2 +
k3)*(k3 - k4)*(k4 - k5)) +
        Power(E,2*I*(k3*x3 + k4*x4))*(k2 + k3)*(k3 + k4)*(k4 - k5) + Power(E,2*I*(k3
+ k4)*x3)*(k2 + k3)*(k3 - k4)*(k4 + k5) -
        Power(E,2*I*(k3*x2 + k4*x3))*(-k2 + k3)*(k3 + k4)*(k4 + k5)))/
```

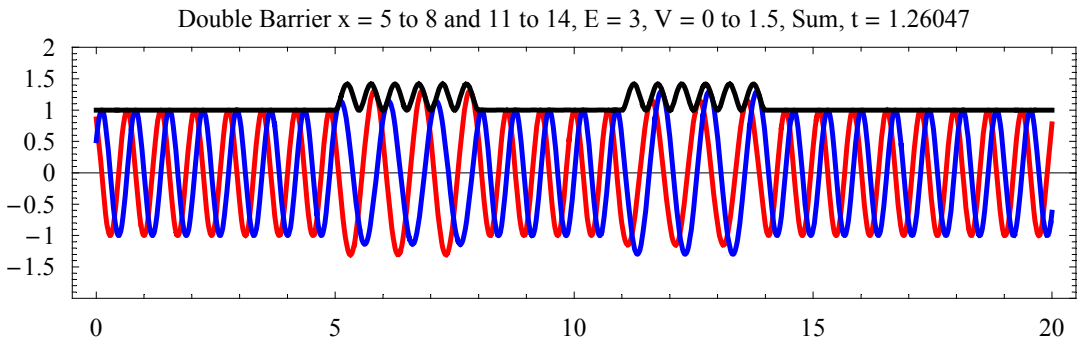
```
    (Power(E,2*I*((k2 + k3)*x2 + k4*x4))*(-k1 + k2)*(k2 - k3)*(k3 - k4)*(k4 - k5) -
      Power(E,2*I*(k2*x1 + k3*x2 + k4*x4))*(k1 + k2)*(k2 + k3)*(k3 - k4)*(k4 - k5) -
      Power(E,2*I*(k2*x1 + k3*x3 + k4*x4))*(k1 + k2)*(k2 - k3)*(k3 + k4)*(k4 - k5) +
      Power(E,2*I*(k2*x2 + k3*x3 + k4*x4))*(-k1 + k2)*(k2 + k3)*(k3 + k4)*(k4 - k5) -
      Power(E,2*I*(k2*x1 + (k3 + k4)*x3))*(k1 + k2)*(k2 - k3)*(k3 - k4)*(k4 + k5) +
      Power(E,2*I*(k2*x2 + (k3 + k4)*x3))*(-k1 + k2)*(k2 + k3)*(k3 - k4)*(k4 + k5) +
      Power(E,2*I*((k2 + k3)*x2 + k4*x3))*(-k1 + k2)*(k2 - k3)*(k3 + k4)*(k4 + k5) -
      Power(E,2*I*(k2*x1 + k3*x2 + k4*x3))*(k1 + k2)*(k2 + k3)*(k3 + k4)*(k4 + k5)),
   (4*Power(E,I*((k1 + k2)*x1 + (k2 + k3)*x2))*k1*k2*
      (-(Power(E,2*I*k4*x4)*(-k3 + k4)*(k4 - k5)) + Power(E,2*I*k4*x3)*(k3 + k4)*(k4
+ k5)))/
    (-(Power(E,2*I*((k2 + k3)*x2 + k4*x4))*(-k1 + k2)*(k2 - k3)*(k3 - k4)*(k4 - k5))
+
      Power(E,2*I*(k2*x1 + k3*x2 + k4*x4))*(k1 + k2)*(k2 + k3)*(k3 - k4)*(k4 - k5) +
      Power(E,2*I*(k2*x1 + k3*x3 + k4*x4))*(k1 + k2)*(k2 - k3)*(k3 + k4)*(k4 - k5) -
      Power(E,2*I*(k2*x2 + k3*x3 + k4*x4))*(-k1 + k2)*(k2 + k3)*(k3 + k4)*(k4 - k5) +
      Power(E,2*I*(k2*x1 + (k3 + k4)*x3))*(k1 + k2)*(k2 - k3)*(k3 - k4)*(k4 + k5) -
      Power(E,2*I*(k2*x2 + (k3 + k4)*x3))*(-k1 + k2)*(k2 + k3)*(k3 - k4)*(k4 + k5) -
      Power(E,2*I*((k2 + k3)*x2 + k4*x3))*(-k1 + k2)*(k2 - k3)*(k3 + k4)*(k4 + k5) +
      Power(E,2*I*(k2*x1 + k3*x2 + k4*x3))*(k1 + k2)*(k2 + k3)*(k3 + k4)*(k4 + k5)),
   (4*Power(E,I*(k1*x1 + k2*(x1 + x2) + k3*(x2 + 2*x3)))*k1*k2*
      (Power(E,2*I*k4*x4)*(k3 + k4)*(k4 - k5) - Power(E,2*I*k4*x3)*(-k3 + k4)*(k4 +
k5)))/
    (-(Power(E,2*I*((k2 + k3)*x2 + k4*x4))*(-k1 + k2)*(k2 - k3)*(k3 - k4)*(k4 - k5))
+
      Power(E,2*I*(k2*x1 + k3*x2 + k4*x4))*(k1 + k2)*(k2 + k3)*(k3 - k4)*(k4 - k5) +
      Power(E,2*I*(k2*x1 + k3*x3 + k4*x4))*(k1 + k2)*(k2 - k3)*(k3 + k4)*(k4 - k5) -
      Power(E,2*I*(k2*x2 + k3*x3 + k4*x4))*(-k1 + k2)*(k2 + k3)*(k3 + k4)*(k4 - k5) +
      Power(E,2*I*(k2*x1 + (k3 + k4)*x3))*(k1 + k2)*(k2 - k3)*(k3 - k4)*(k4 + k5) -
      Power(E,2*I*(k2*x2 + (k3 + k4)*x3))*(-k1 + k2)*(k2 + k3)*(k3 - k4)*(k4 + k5) -
      Power(E,2*I*((k2 + k3)*x2 + k4*x3))*(-k1 + k2)*(k2 - k3)*(k3 + k4)*(k4 + k5) +
      Power(E,2*I*(k2*x1 + k3*x2 + k4*x3))*(k1 + k2)*(k2 + k3)*(k3 + k4)*(k4 + k5)),
   (8*Power(E,I*(k1*x1 + k3*x2 + k2*(x1 + x2) + (k3 + k4)*x3))*k1*k2*k3*(k4 + k5))/
    (-(Power(E,2*I*((k2 + k3)*x2 + k4*x4))*(-k1 + k2)*(k2 - k3)*(k3 - k4)*(k4 - k5))
+
      Power(E,2*I*(k2*x1 + k3*x2 + k4*x4))*(k1 + k2)*(k2 + k3)*(k3 - k4)*(k4 - k5) +
      Power(E,2*I*(k2*x1 + k3*x3 + k4*x4))*(k1 + k2)*(k2 - k3)*(k3 + k4)*(k4 - k5) -
      Power(E,2*I*(k2*x2 + k3*x3 + k4*x4))*(-k1 + k2)*(k2 + k3)*(k3 + k4)*(k4 - k5) +
      Power(E,2*I*(k2*x1 + (k3 + k4)*x3))*(k1 + k2)*(k2 - k3)*(k3 - k4)*(k4 + k5) -
      Power(E,2*I*(k2*x2 + (k3 + k4)*x3))*(-k1 + k2)*(k2 + k3)*(k3 - k4)*(k4 + k5) -
      Power(E,2*I*((k2 + k3)*x2 + k4*x3))*(-k1 + k2)*(k2 - k3)*(k3 + k4)*(k4 + k5) +
      Power(E,2*I*(k2*x1 + k3*x2 + k4*x3))*(k1 + k2)*(k2 + k3)*(k3 + k4)*(k4 + k5)),
   (8*Power(E,I*(k1*x1 + k3*x2 + k2*(x1 + x2) + k3*x3 + k4*x3 +
2*k4*x4))*k1*k2*k3*(k4 - k5))/
    (-(Power(E,2*I*((k2 + k3)*x2 + k4*x4))*(-k1 + k2)*(k2 - k3)*(k3 - k4)*(k4 - k5))
+
      Power(E,2*I*(k2*x1 + k3*x2 + k4*x4))*(k1 + k2)*(k2 + k3)*(k3 - k4)*(k4 - k5) +
      Power(E,2*I*(k2*x1 + k3*x3 + k4*x4))*(k1 + k2)*(k2 - k3)*(k3 + k4)*(k4 - k5) -
      Power(E,2*I*(k2*x2 + k3*x3 + k4*x4))*(-k1 + k2)*(k2 + k3)*(k3 + k4)*(k4 - k5) +
      Power(E,2*I*(k2*x1 + (k3 + k4)*x3))*(k1 + k2)*(k2 - k3)*(k3 - k4)*(k4 + k5) -
      Power(E,2*I*(k2*x2 + (k3 + k4)*x3))*(-k1 + k2)*(k2 + k3)*(k3 - k4)*(k4 + k5) -
      Power(E,2*I*((k2 + k3)*x2 + k4*x3))*(-k1 + k2)*(k2 - k3)*(k3 + k4)*(k4 + k5) +
      Power(E,2*I*(k2*x1 + k3*x2 + k4*x3))*(k1 + k2)*(k2 + k3)*(k3 + k4)*(k4 + k5)),
   (16*Power(E,I*(k1*x1 + k3*x2 + k2*(x1 + x2) + k3*x3 + k4*x3 + k4*x4 -
k5*x4))*k1*k2*k3*k4)/
    (-(Power(E,2*I*((k2 + k3)*x2 + k4*x4))*(-k1 + k2)*(k2 - k3)*(k3 - k4)*(k4 - k5))
+
      Power(E,2*I*(k2*x1 + k3*x2 + k4*x4))*(k1 + k2)*(k2 + k3)*(k3 - k4)*(k4 - k5) +
      Power(E,2*I*(k2*x1 + k3*x3 + k4*x4))*(k1 + k2)*(k2 - k3)*(k3 + k4)*(k4 - k5) -
      Power(E,2*I*(k2*x2 + k3*x3 + k4*x4))*(-k1 + k2)*(k2 + k3)*(k3 + k4)*(k4 - k5) +
      Power(E,2*I*(k2*x1 + (k3 + k4)*x3))*(k1 + k2)*(k2 - k3)*(k3 - k4)*(k4 + k5) -
```

```
      Power(E,2*I*(k2*x2 + (k3 + k4)*x3))*(-k1 + k2)*(k2 + k3)*(k3 - k4)*(k4 + k5) -
      Power(E,2*I*((k2 + k3)*x2 + k4*x3))*(-k1 + k2)*(k2 - k3)*(k3 + k4)*(k4 + k5) +
      Power(E,2*I*(k2*x1 + k3*x2 + k4*x3))*(k1 + k2)*(k2 + k3)*(k3 + k4)*(k4 + k5)))
```

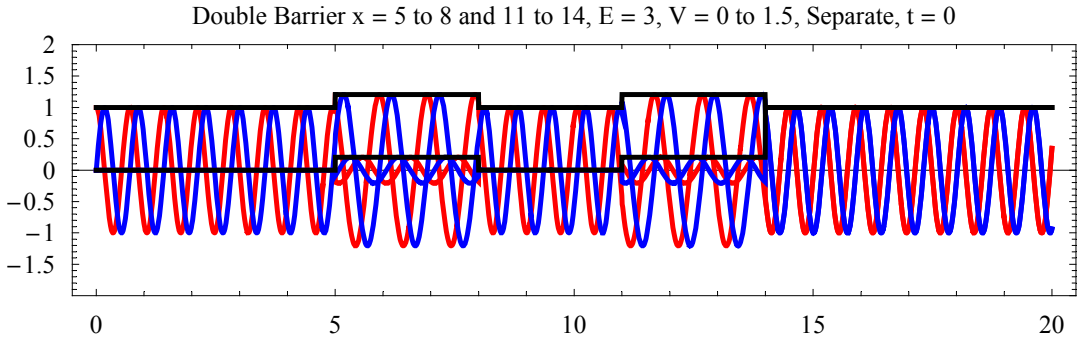
```
EE = 3; (* eV *)
V1 = V3 = V5 = 0; (* eV *)
V2 = V4 = 1.5;
L1 = 2;
L2 = 2;
L3 = 2;
m = 0.511 * 10^6 (hbar / 197)^2; (* eV/c^2 *)
hbar = 0.658; (* eV fs *)
k1 = Sqrt[2 m (EE - V1) / hbar^2];
k2 = Sqrt[2 m (EE - V2) / hbar^2];
k3 = Sqrt[2 m (EE - V3) / hbar^2];
k4 = Sqrt[2 m (EE - V4) / hbar^2];
k5 = Sqrt[2 m (EE - V5) / hbar^2];
period = 2 π hbar / E;
x1 = 5;
x2 = 8;
x3 = 11;
x4 = 14;
$TextStyle = {FontFamily → "Times", FontSize → 12};

movie =
  Table[Plot[{Re[ψ Exp[-i EE t / hbar]], Im[ψ Exp[-i EE t / hbar]], Abs[ψ Exp[-i EE t / hbar]]},
    {x, 0, 20}, PlotRange → {-2, 2}, PlotPoints → 100, PlotStyle →
     {{Thickness[0.005], Red}, {Thickness[0.005], Blue}, {Thickness[0.005], Black}},
    PlotLabel → StringJoin["Double Barrier x = 5 to 8 and 11 to
        14, E = 3, V = 0 to 1.5, Sum, t = ", ToString[t]],
    Frame → True, AspectRatio → 1 / 4, ImageSize → 9 * 72, PlotPoints → 100],
   {t, 0, period - (period + 1) / 10, (period + 1) / 10}];
```

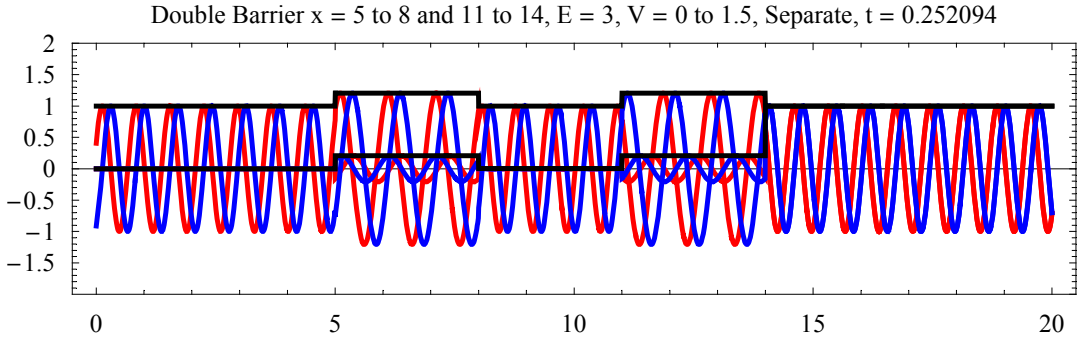


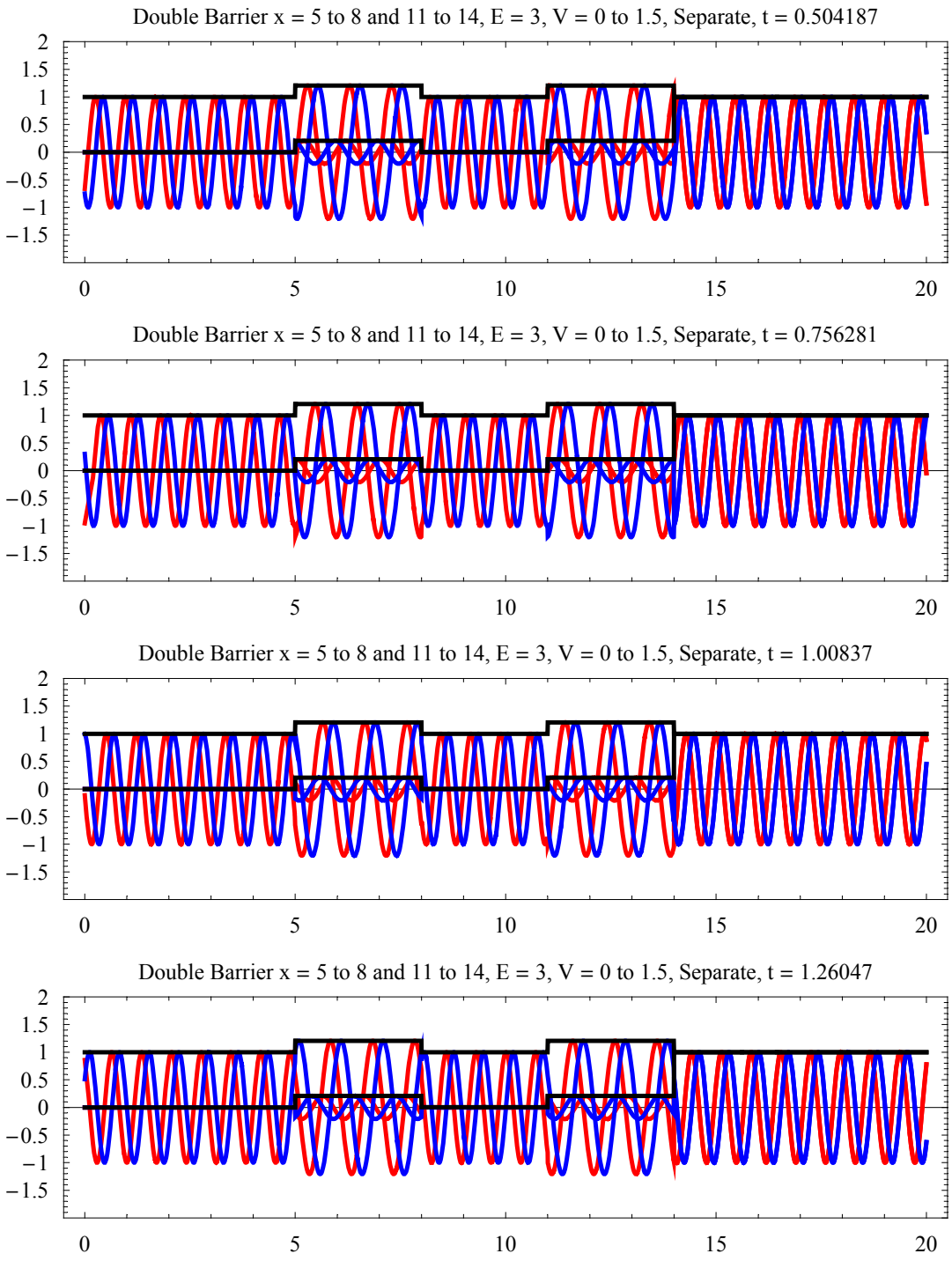

Double Barrier x = 5 to 8 and 11 to 14, E = 3, V = 0 to 1.5, Sum, t = 0.252094
Double Barrier x = 5 to 8 and 11 to 14, E = 3, V = 0 to 1.5, Sum, t = 0.504187
Double Barrier x = 5 to 8 and 11 to 14, E = 3, V = 0 to 1.5, Sum, t = 0.756281
Double Barrier x = 5 to 8 and 11 to 14, E = 3, V = 0 to 1.5, Sum, t = 1.00837
2
1.5
1
0.5
0
−0.5
−1
−1.5
0
5
10
15
20




```
movie = Table[Plot[Evaluate[
      {Re[{If[x ≤ x1, ψ1I, If[x ≤ x2, ψ2I, If[x ≤ x3, ψ3I, If[x ≤ x4, ψ4I, ψ5]]]], If[x ≤ x1,
           ψ1R, If[x ≤ x2, ψ2R, If[x ≤ x3, ψ3R, If[x ≤ x4, ψ4R, ψ5]]]]} Exp[-i EE t / hbar]],
       Im[{If[x ≤ x1, ψ1I, If[x ≤ x2, ψ2I, If[x ≤ x3, ψ3I, If[x ≤ x4, ψ4I, ψ5]]]], If[x ≤ x1,
           ψ1R, If[x ≤ x2, ψ2R, If[x ≤ x3, ψ3R, If[x ≤ x4, ψ4R, ψ5]]]]} Exp[-i EE t / hbar]],
       Abs[{If[x ≤ x1, ψ1I, If[x ≤ x2, ψ2I, If[x ≤ x3, ψ3I, If[x ≤ x4, ψ4I, ψ5]]]], If[x ≤ x1,
           ψ1R, If[x ≤ x2, ψ2R, If[x ≤ x3, ψ3R, If[x ≤ x4, ψ4R, ψ5]]]]} Exp[-i EE t / hbar]]}],
     {x, 0, 20}, PlotRange → {-2, 2}, PlotStyle → {{Thickness[0.005], Red},
       {Thickness[0.005], Red}, {Thickness[0.005], Blue}, {Thickness[0.005], Blue},
       {Thickness[0.005], Black}, {Thickness[0.005], Black}},
     PlotLabel → StringJoin["Double Barrier x = 5 to 8 and 11 to 14,
         E = 3, V = 0 to 1.5, Separate, t = ", ToString[t]],
     Frame → True, AspectRatio → 1 / 4, ImageSize → 9 * 72, PlotPoints → 100],
    {t, 0, period - (period + 1) / 10, (period + 1) / 10}];
```






Double Barrier x = 5 to 8 and 11 to 14, E = 3, V = 0 to 1.5, Separate, t = 0.504187
Double Barrier x = 5 to 8 and 11 to 14, E = 3, V = 0 to 1.5, Separate, t = 0.756281
Double Barrier x = 5 to 8 and 11 to 14, E = 3, V = 0 to 1.5, Separate, t = 1.00837
Double Barrier x = 5 to 8 and 11 to 14, E = 3, V = 0 to 1.5, Separate, t = 1.26047
2
1.5
1
0.5
0
−0.5
−1
−1.5
0
5
10
15
20