1-dimensionale Burgersgleichung

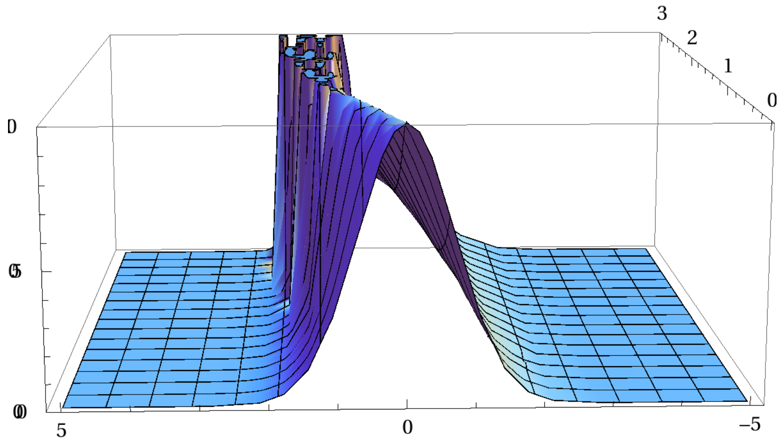
Numerisch ohne Viskositaet:

In[3]:=
```
NDSolve[{D[v[t, x], t] == -v[t, x] D[v[t, x], x],
  v[0, x] == Exp[-x^2], v[t, -5] == Exp[-5^2], v[t, 5] == Exp[-5^2]}, v,
 {t, 0, 3}, {x, -5, 5}, Method → {"MethodOfLines", "SpatialDiscretization" →
    {"TensorProductGrid", MaxPoints → 1 000 000,  StartingPoints → 1 000 000}}]
```

Out[3]=
```
{{v → InterpolatingFunction[{{0., 3.}, {-5., 5.}}, <>]}}
```

In[4]:=
```
Plot3D[Evaluate[v[t, x] /. %], {t, 0, 3}, {x, -5, 5}, PlotRange → {0, 1}]
```

Out[4]=



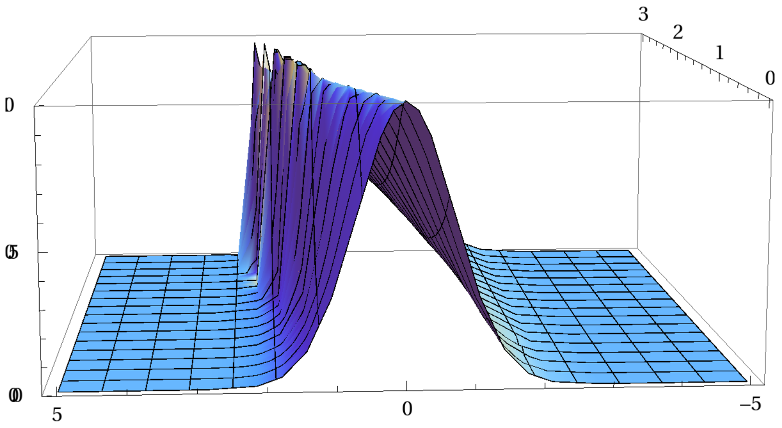
Numerisch mit Viskositaet:

In[1]:=
```
NDSolve[{D[v[t, x], t] == -v[t, x] D[v[t, x], x] + 0.01 D[v[t, x], x, x],
  v[0, x] == Exp[-x^2], v[t, -5] == Exp[-5^2], v[t, 5] == Exp[-5^2]}, v,
 {t, 0, 3}, {x, -5, 5}, Method → {"MethodOfLines", "SpatialDiscretization" →
    {"TensorProductGrid", MaxPoints → 1 000 000,  StartingPoints → 1 000 000}}]
```

Out[1]=
```
{{v → InterpolatingFunction[{{0., 3.}, {-5., 5.}}, <>]}}
```

In[2]:=
```
Plot3D[Evaluate[v[t, x] /. %], {t, 0, 3}, {x, 5, -5}, PlotRange → {0, 1}]
```

Out[2]=



Exakt ohne Viskositaet:

In[8]:=
```
ParametricPlot3D[{x + t Exp[-x^2], t, Exp[-x^2]}, {x, -5, 5}, {t, 0, 3}, AspectRatio → 1]
```

Out[8]=