

## Pursuit and evasion in two dimensional space

```
In[32]:= << Graphics`Graphics3D`
```

### ■ Uniform solution

```
In[54]:= deq = {u'[t] == r (1 - u[t] / K) u[t] - a u[t] v[t],
               v'[t] == b u[t] v[t] - d v[t], u[0] == u0, v[0] == v0}
```

```
Out[54]= {u'[t] == r u[t] (1 - u[t] / K) - a u[t] v[t], v'[t] == -d v[t] + b u[t] v[t], u[0] == u0, v[0] == v0}
```

```
In[55]:= para = {r -> 1, K -> 2, a -> 1, b -> 1, d -> 1}
```

```
Out[55]= {r -> 1, K -> 2, a -> 1, b -> 1, d -> 1}
```

```
In[61]:= deqN = deq /. para /. {u0 -> 0.01, v0 -> 0.01}
```

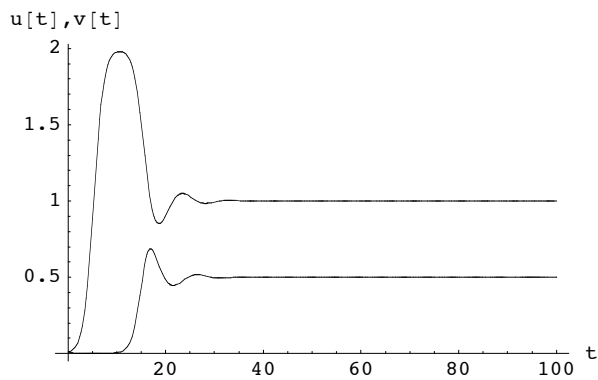
```
Out[61]= {u'[t] == (1 - u[t] / 2) u[t] - u[t] v[t], v'[t] == -v[t] + u[t] v[t], u[0] == 0.01, v[0] == 0.01}
```

```
In[62]:= endT = 100;
```

```
In[63]:= sol = NDSolve[deqN, {u[t], v[t]}, {t, 0, endT}]
```

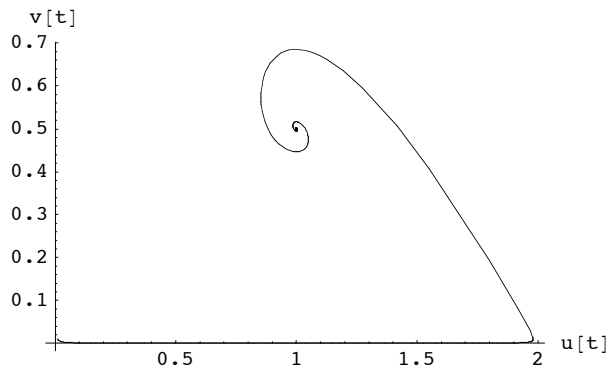
```
Out[63]= {{u[t] -> InterpolatingFunction[{{0., 100.}}, <>][t],
           v[t] -> InterpolatingFunction[{{0., 100.}}, <>][t]}}
```

```
In[64]:= Plot[{Evaluate[u[t]] /. sol, Evaluate[v[t]] /. sol},
              {t, 0, endT}, PlotRange -> All, AxesLabel -> {"t", "u[t], v[t]"}]
```



```
Out[64]= - Graphics -
```

```
In[65]:= ParametricPlot[Evaluate[{u[t], v[t]}] /. sol,
  {t, 0, endT}, PlotRange -> All, AxesLabel -> {"u[t]", "v[t]"}]
```



```
Out[65]= - Graphics -
```

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## ■ Reation diffusion

```
In[9]:= SetDirectory[
  "/Users/takasu/home/Granada/数值計算一般/拡散方程式/reaction_diffusion/build/Debug/"]
```

```
Out[9]= /Users/takasu/home/Granada/数值計算一般/拡散方程式/reaction_diffusion/build/Debug
```

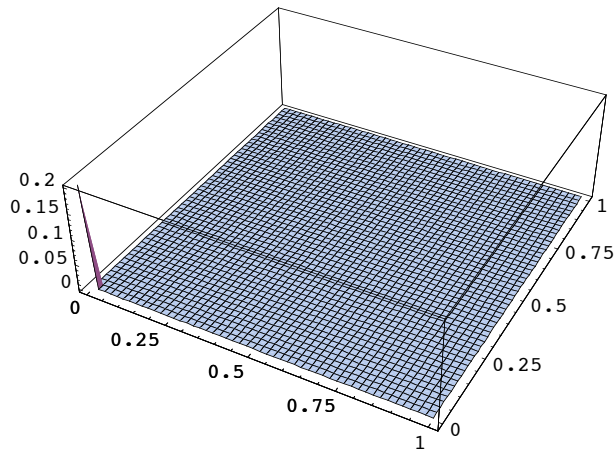
```
In[73]:= size = 51;
data1 = ReadList["RD-2dim-test-u", {Real, Real, Real}];
data1 = Partition[Partition[data1, size], size];
Length[data1]

data2 = ReadList["RD-2dim-test-v", {Real, Real, Real}];
data2 = Partition[Partition[data2, size], size];
Length[data2]
```

```
Out[76]= 101
```

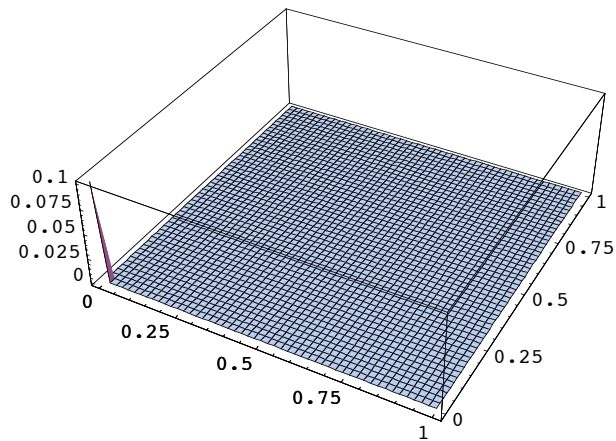
```
Out[79]= 101
```

```
In[80]:= ListSurfacePlot3D[data1[[1]], PlotRange → All, BoxRatios → {3, 3, 1}, Axes → True]
```



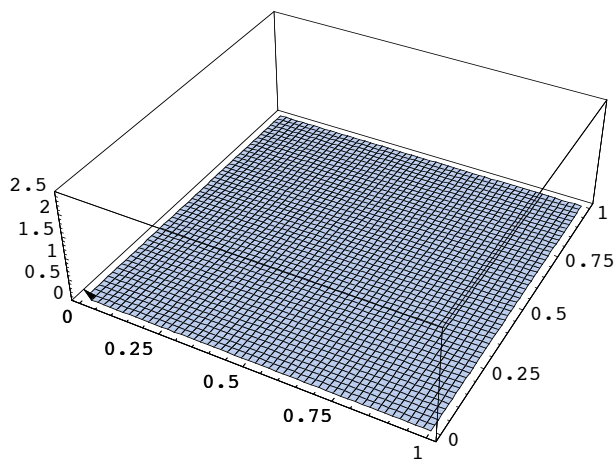
```
Out[80]= - Graphics3D -
```

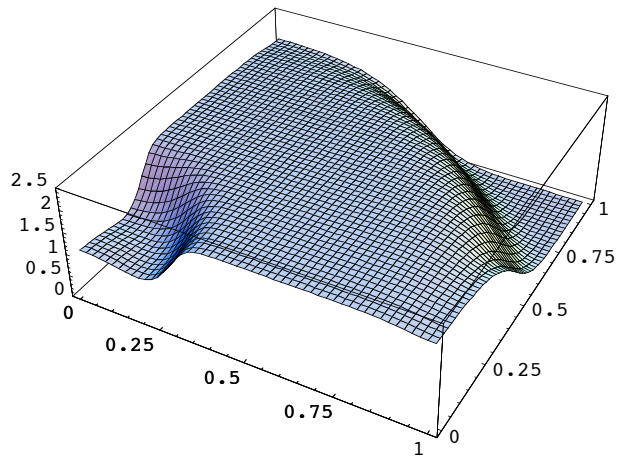
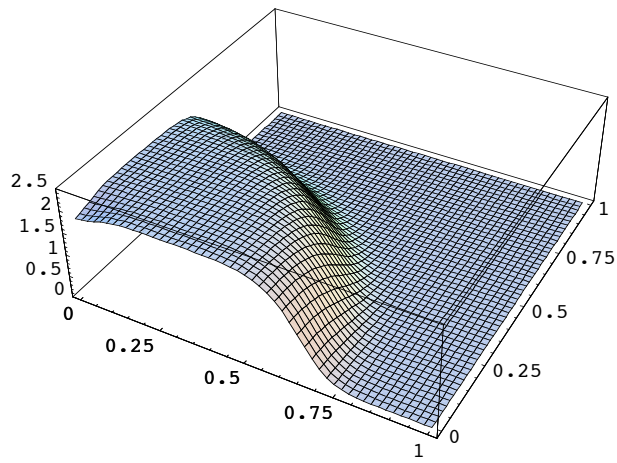
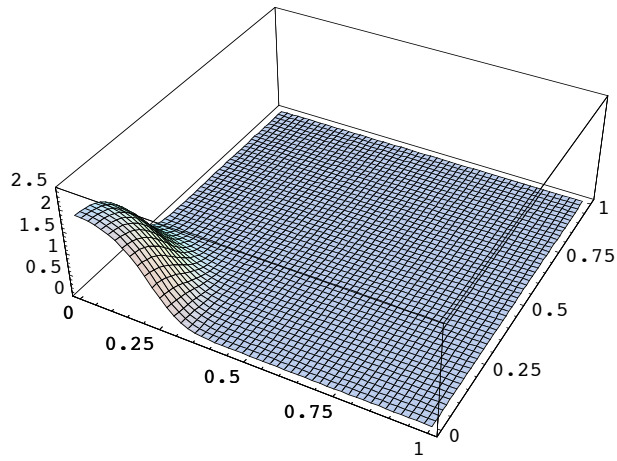
```
In[81]:= ListSurfacePlot3D[data2[[1]], PlotRange → All, BoxRatios → {3, 3, 1}, Axes → True]
```

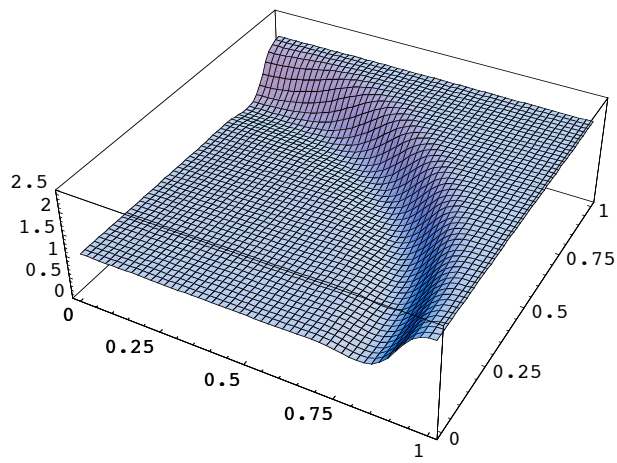
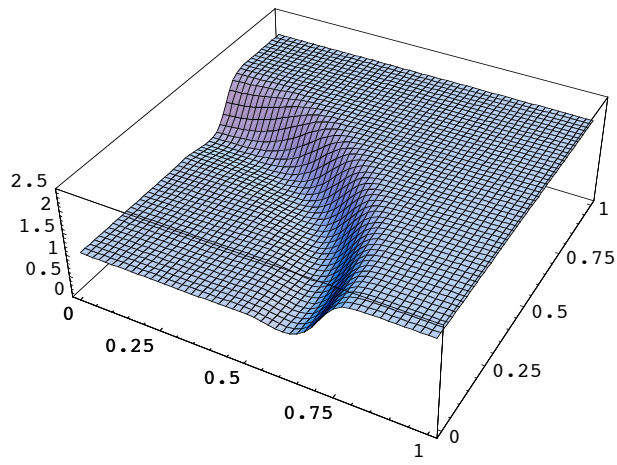
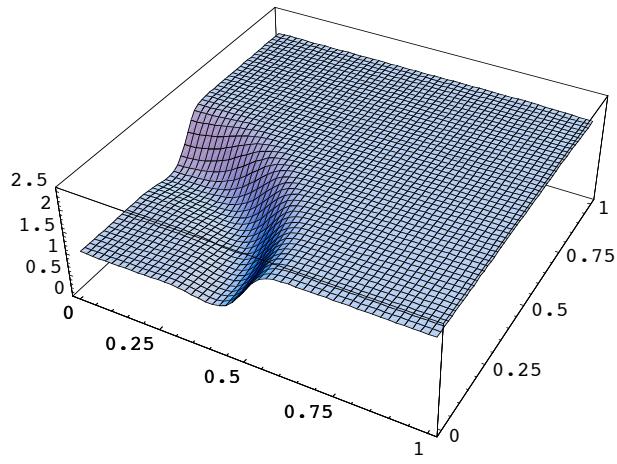


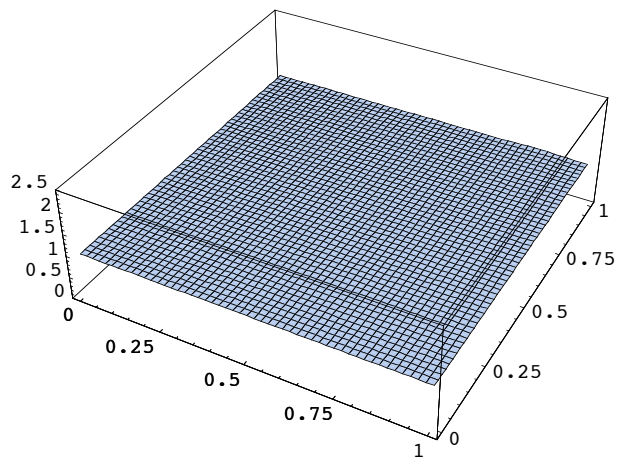
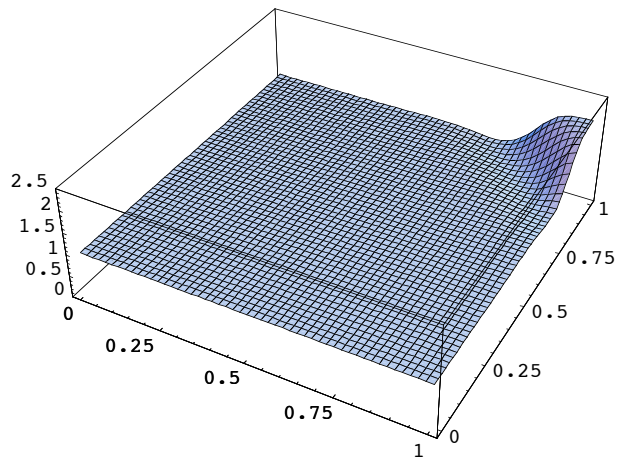
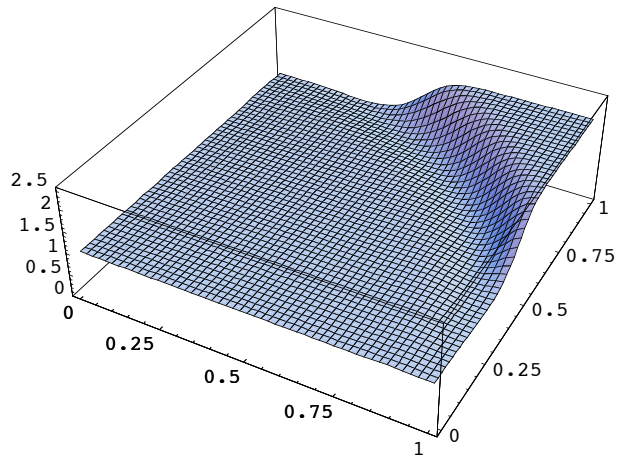
```
Out[81]= - Graphics3D -
```

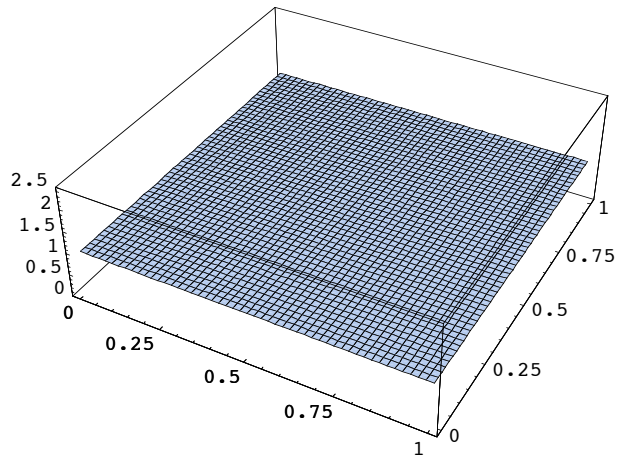
```
In[82]:= Do[  
  ListSurfacePlot3D[data1[[i]], PlotRange → {0, 2.5},  
  BoxRatios → {3, 3, 1}, Axes → True], {i, 1, Length[data1], 10}  
]
```



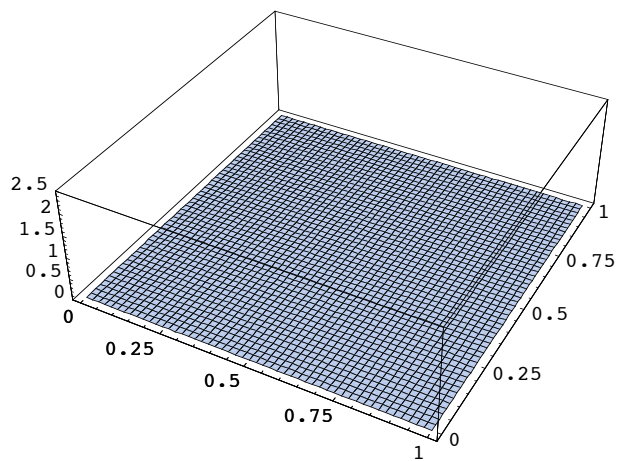
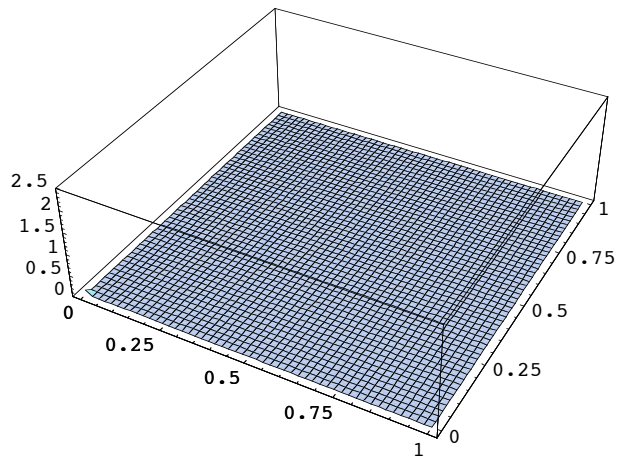


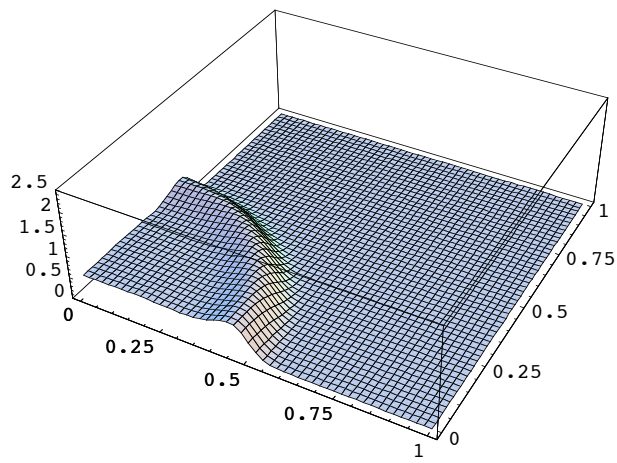
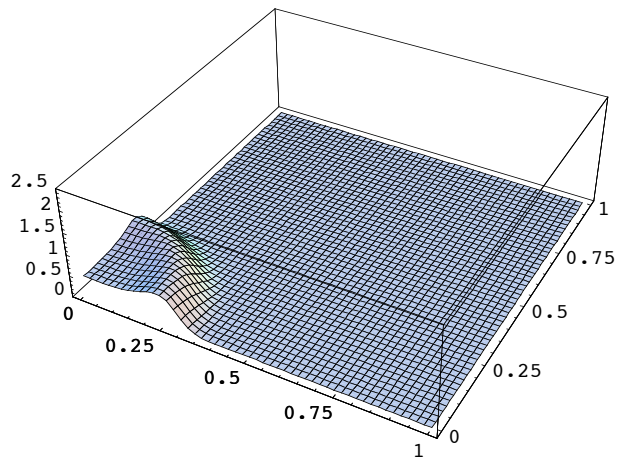
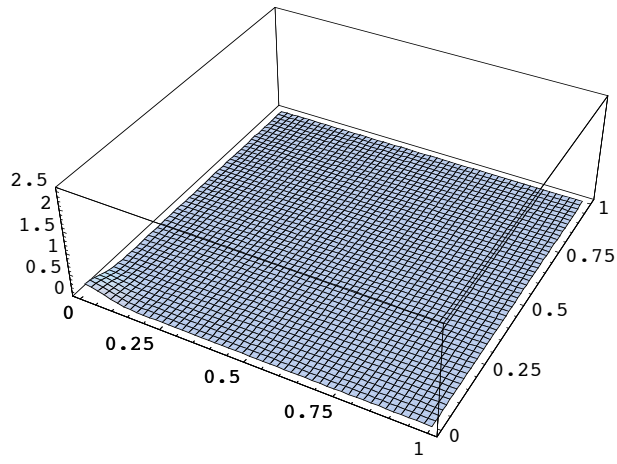




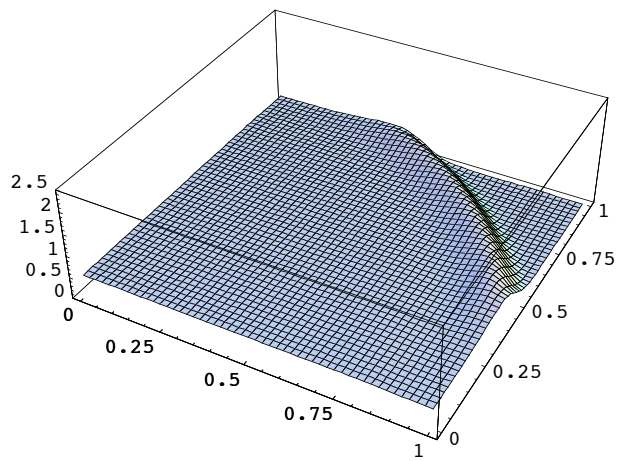
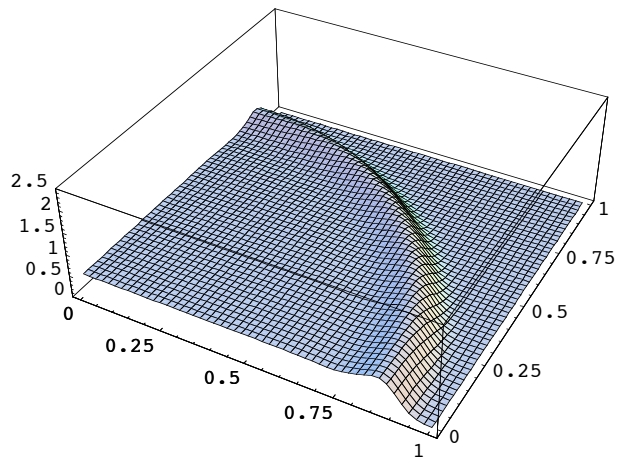
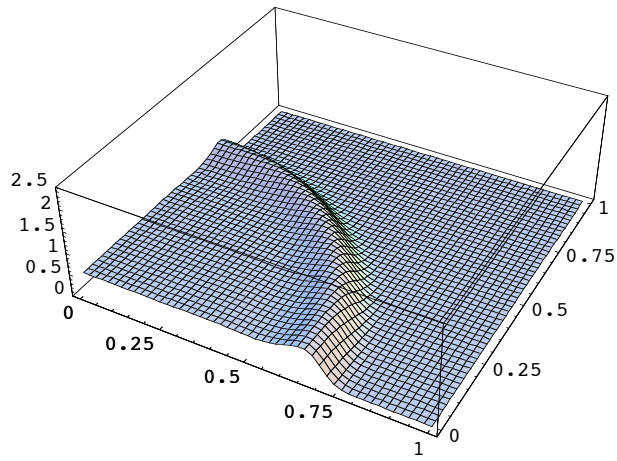


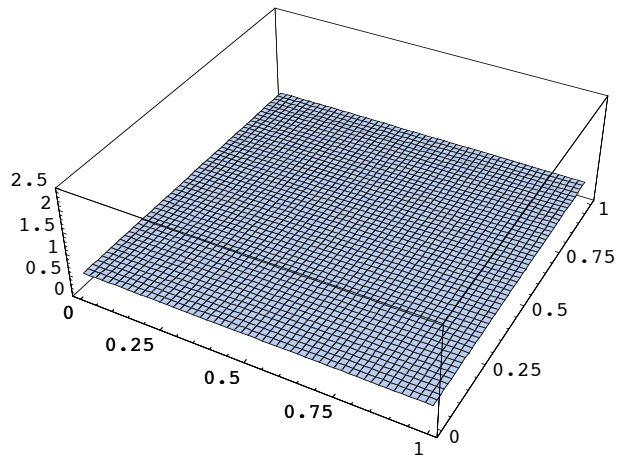
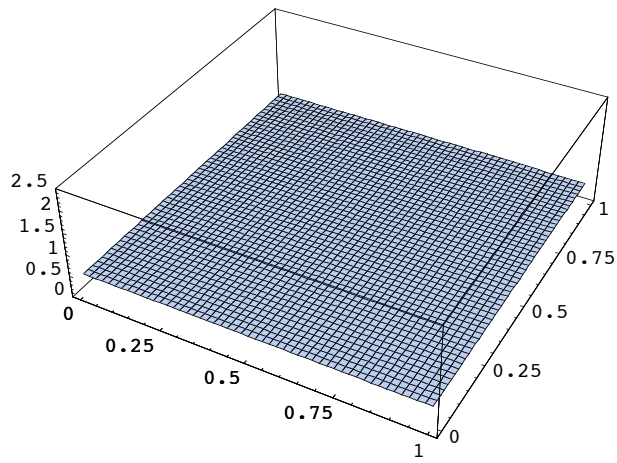
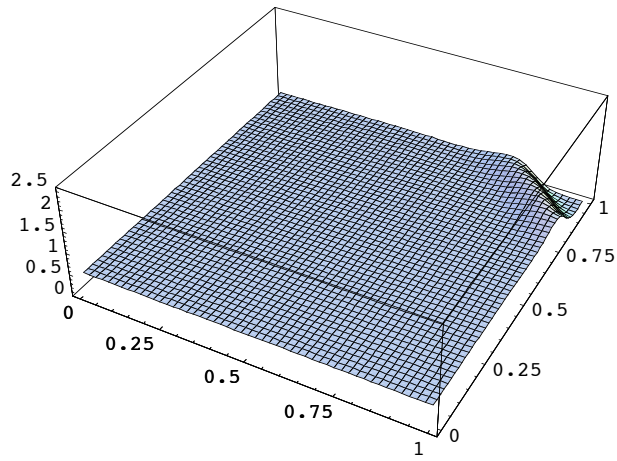
```
In[83]:= Do[  
  ListSurfacePlot3D[data2[[i]], PlotRange -> {0, 2.5},  
  BoxRatios -> {3, 3, 1}, Axes -> True], {i, 1, Length[data1], 10}  
]
```











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