In [1]:

```
%matplotlib inline
```

In [2]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
```

In [3]:

```
def p_next(G, p, r, noise):
    return r * (1/(1 / ((G.dot(p) + noise) * (1 / (G.diagonal()*p)) -1))) * p
def SIR_current(G, p, noise):
    return 1 / ((G.dot(p) + noise) * (1 / (G.diagonal()*p)) -1)
```

In [4]:

```
G = np.array([[1, 0.1, 0.3],[0.2, 1, 0.3],[0.2, 0.2, 1]])
```

In [8]:

```
r = np.array([1, 1.5, 1])
```

In [9]:

```
p0 = np.array([1, 1, 1])
```

In [11]:

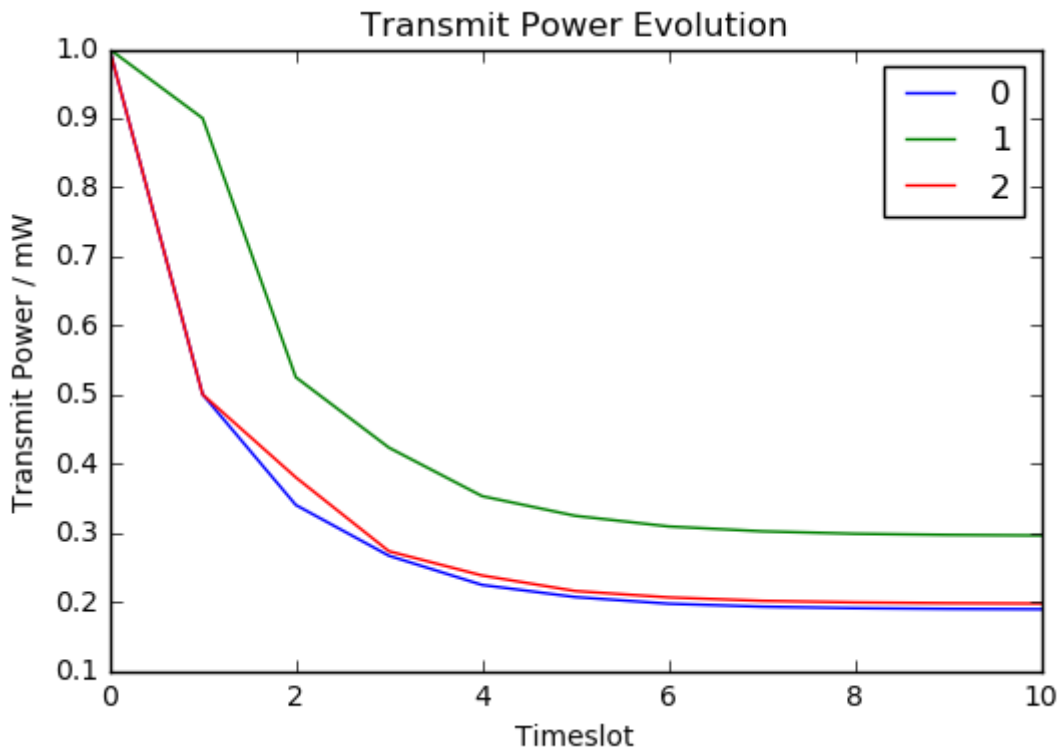
```
noise = 0.1
```

In [81]:

```
p10_list = []
for i in range(10):
    if len(p10_list) == 0:
        p10_list.append(p0)
        p_current = p_next(G, p0, r, noise)
    else:
        p_current = p_next(G, p10_list[-1], r, noise)
    p10_list.append(p_current)
p_pd = pd.DataFrame(p10_list)
p_pd.plot()
plt.title("Transmit Power Evolution")
plt.xlabel("Timeslot")
plt.ylabel("Transmit Power / mW")
```

Out[81]:

```
<matplotlib.text.Text at 0x7feca8fe5650>
```

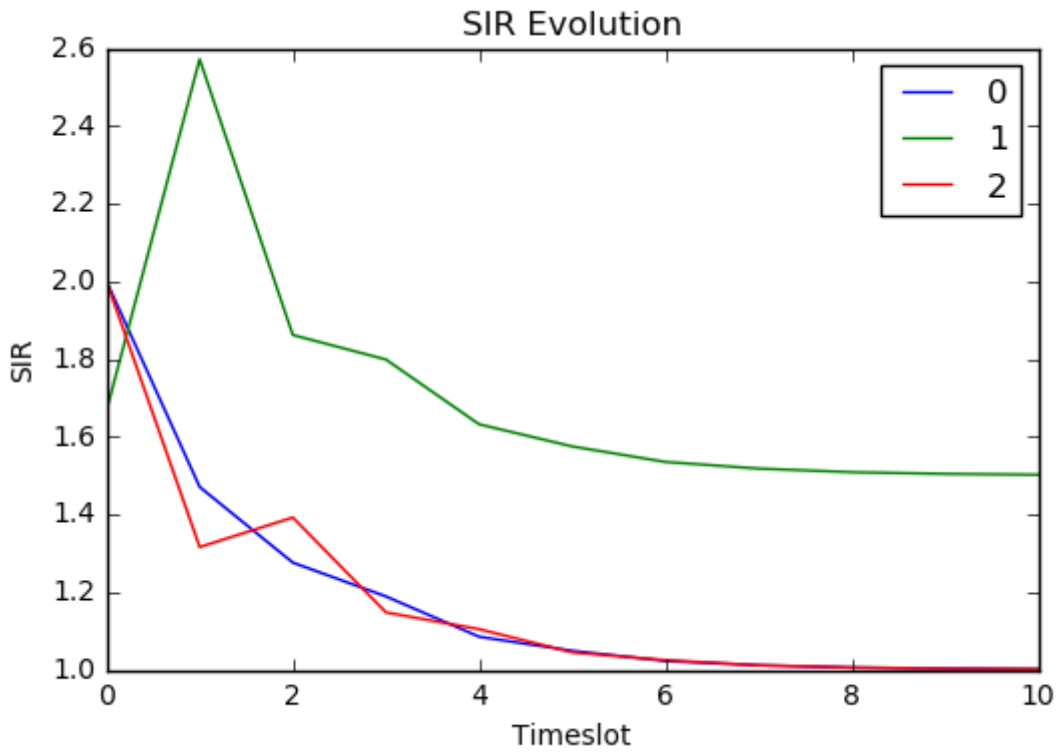


In [75]:

```
SIR10_list = []
p10_list = []
for i in range(10):
    if len(p10_list) == 0:
        SIR10_list.append(SIR_current(G, p0, noise))
        p_current = p_next(G, p0, r, noise)
        SIR = SIR_current(G, p_current, noise)
    else:
        p_current = p_next(G, p10_list[-1], r, noise)
        SIR = SIR_current(G, p_current, noise)
    p10_list.append(p_current)
    SIR10_list.append(SIR)
SIR_pd = pd.DataFrame(SIR10_list)
SIR_pd.plot()
plt.title("SIR Evolution")
plt.xlabel("Timeslot")
plt.ylabel("SIR")
```

Out[75]:

```
<matplotlib.text.Text at 0x7feca96d57d0>
```



In [82]:

```
p10_list[-1]
```

Out[82]:

```
array([ 0.18900305,  0.2958567 ,  0.19723977])
```

In [83]:

```
SIR10_list[-1]
```

Out[83]:

```
array([ 1.00130033,  1.50202004,  1.00135969])
```

In [84]:

```
p_new_0 =np.append(p10_list[-1], 1)
```

In [86]:

```
p_new_0
```

Out[86]:

```
array([ 0.18900305,  0.2958567 ,  0.19723977,  1.        ])
```

In [87]:

```
r_new = np.append(r,1)
```

In [88]:

```
r_new
```

Out[88]:

```
array([ 1. ,  1.5,  1. ,  1. ])
```

In [89]:

```
G_new  = np.array([[1, 0.1, 0.3, 0.1],[0.2, 1, 0.3, 0.1],[0.2, 0.2, 1, 0.1], [0.1, 0.1,
0.1, 1]])
```

In [90]:

```
p10_list = []
for i in range(10):
    if len(p10_list) == 0:
        p10_list.append(p_new_0)
        p_current = p_next(G_new, p_new_0, r_new, noise)
    else:
        p_current = p_next(G_new, p10_list[-1], r_new, noise)
    p10_list.append(p_current)
p_pd = pd.DataFrame(p10_list)
p_pd.plot()
plt.title("Transmit Power Evolution")
plt.xlabel("Timeslot")
plt.ylabel("Transmit Power / mW")
```

Out[90]:

```
<matplotlib.text.Text at 0x7feca8dd3e90>
```