

```
ln[1]:= Table[1 / 2 KroneckerDelta[i, j], {i, 1, 20}, {j, 0, 19}] +
        Table[1 / 2 KroneckerDelta[i, j], {i, 0, 19}, {j, 1, 20}]
```

```
ln[3]:= T = { { 1/2, 1/2, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
               { 1/2, 0, 1/2, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
               { 0, 1/2, 0, 1/2, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
               { 0, 0, 1/2, 0, 1/2, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
               { 0, 0, 0, 1/2, 0, 1/2, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
               { 0, 0, 0, 0, 1/2, 0, 1/2, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
               { 0, 0, 0, 0, 0, 1/2, 0, 1/2, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
               { 0, 0, 0, 0, 0, 0, 1/2, 0, 1/2, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
               { 0, 0, 0, 0, 0, 0, 0, 1/2, 0, 1/2, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
               { 0, 0, 0, 0, 0, 0, 0, 0, 1/2, 0, 1/2, 0, 0, 0, 0, 0, 0, 0, 0, 0},
               { 0, 0, 0, 0, 0, 0, 0, 0, 0, 1/2, 0, 1/2, 0, 0, 0, 0, 0, 0, 0, 0},
               { 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1/2, 0, 1/2, 0, 0, 0, 0, 0, 0, 0},
               { 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1/2, 0, 1/2, 0, 0, 0, 0, 0, 0},
               { 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1/2, 0, 1/2, 0, 0, 0, 0, 0},
               { 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1/2, 0, 1/2, 0, 0, 0},
               { 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1/2, 0, 1/2, 0, 0},
               { 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1/2, 0, 1/2},
               { 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1/2, 1/2} };
```

In[49]:= **T // MatrixForm**

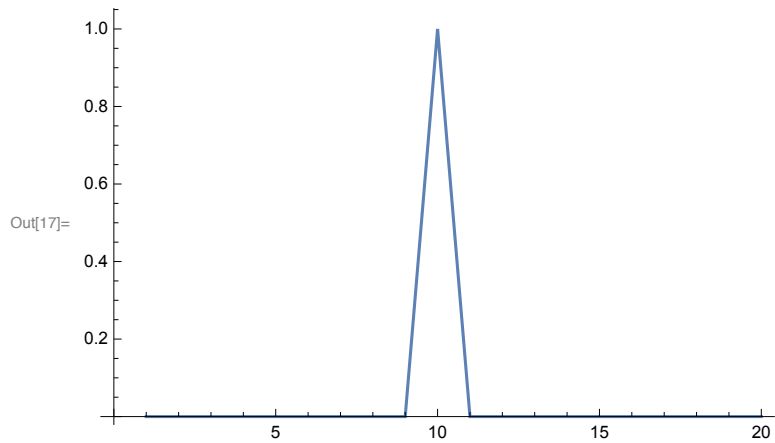
Out[49]//MatrixForm=

$$\begin{pmatrix} \frac{1}{2} & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{1}{2} & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{1}{2} & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{2} & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & \frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & \frac{1}{2} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & \frac{1}{2} & 0 & 0 \end{pmatrix}$$

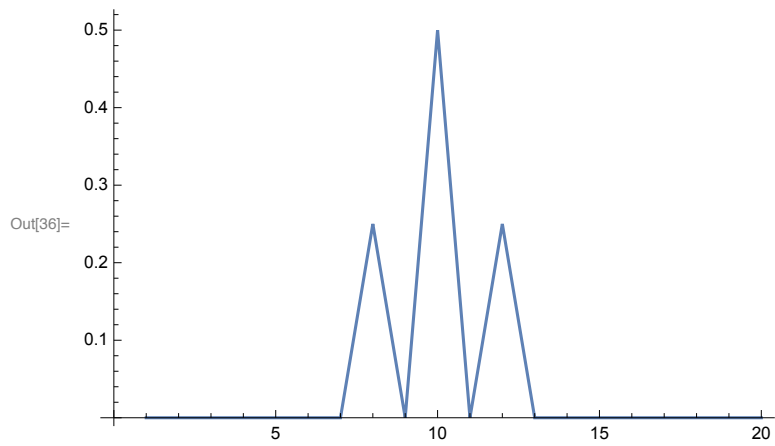
In[6]:= **p0 = Table[KroneckerDelta[i, 10], {i, 1, 20}]**

Out[6]= {0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0}

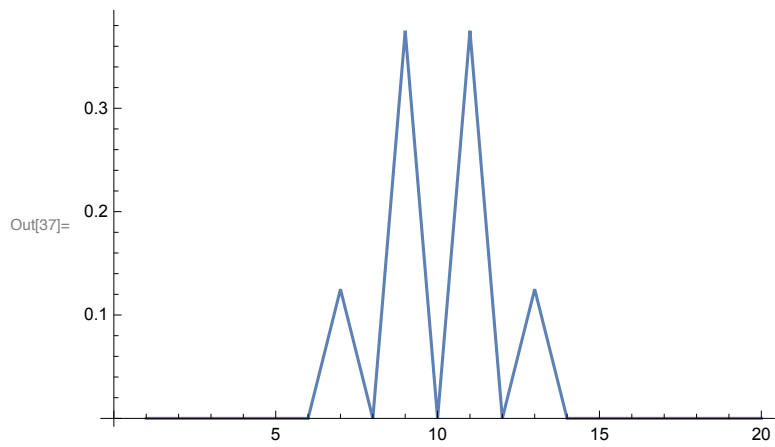
In[17]:= **ListLinePlot[p0]**



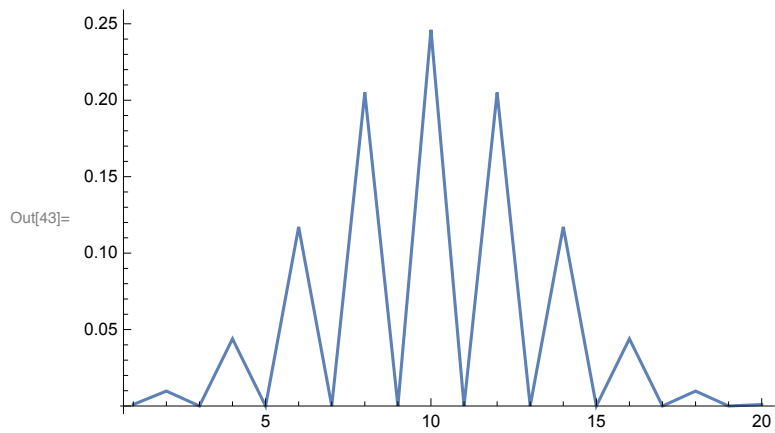
In[36]:= **ListLinePlot**[**T.T.p0**]



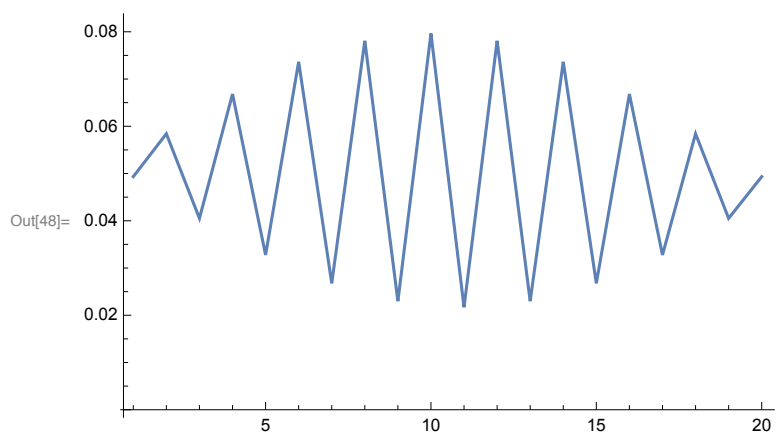
In[37]:= **ListLinePlot**[**T.T.T.p0**]



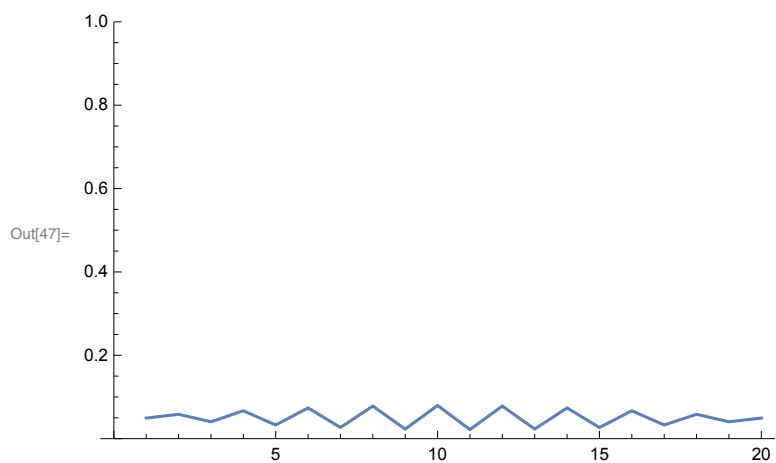
In[43]:= **ListLinePlot**[**MatrixPower**[**T**, 10].**p0**, **PlotRange** → **Full**]



In[48]:= **ListLinePlot**[**MatrixPower**[**T**, 100]. **p0**, **PlotRange** → **Full**]



In[47]:= **ListLinePlot**[**MatrixPower**[**T**, 100]. **p0**, **PlotRange** → {**0**, **1**}]



In[35]:= **T.T.p0**

Out[35]= $\{0, 0, 0, 0, 0, 0, 0, 0, \frac{1}{4}, 0, \frac{1}{2}, 0, \frac{1}{4}, 0, 0, 0, 0, 0, 0, 0, 0\}$

In[34]:= **T⁴.p0**

Out[34]= $\{0, 0, 0, 0, 0, 0, 0, 0, 0, \frac{1}{16}, 0, \frac{1}{16}, 0, 0, 0, 0, 0, 0, 0, 0, 0\}$