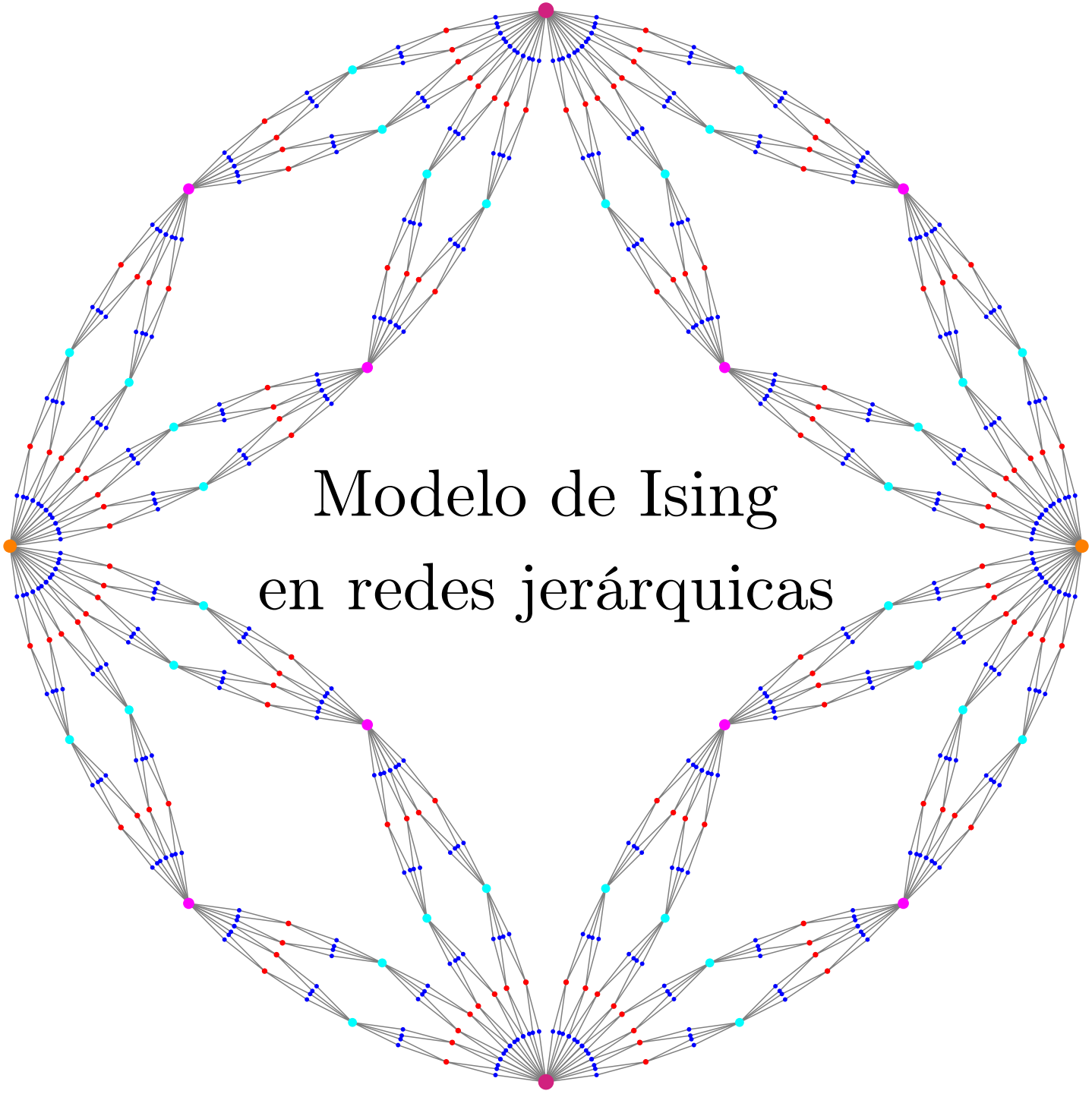
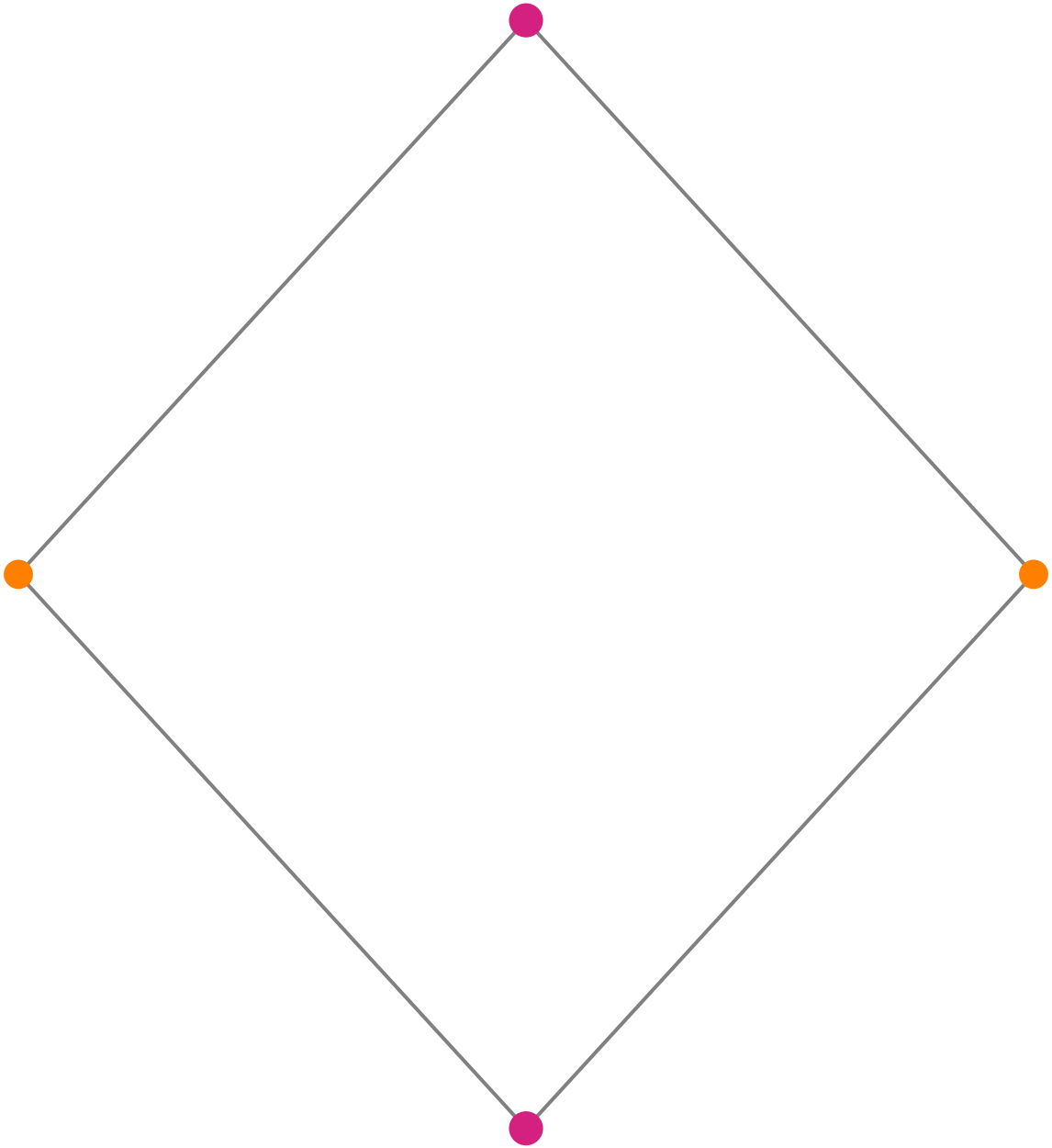
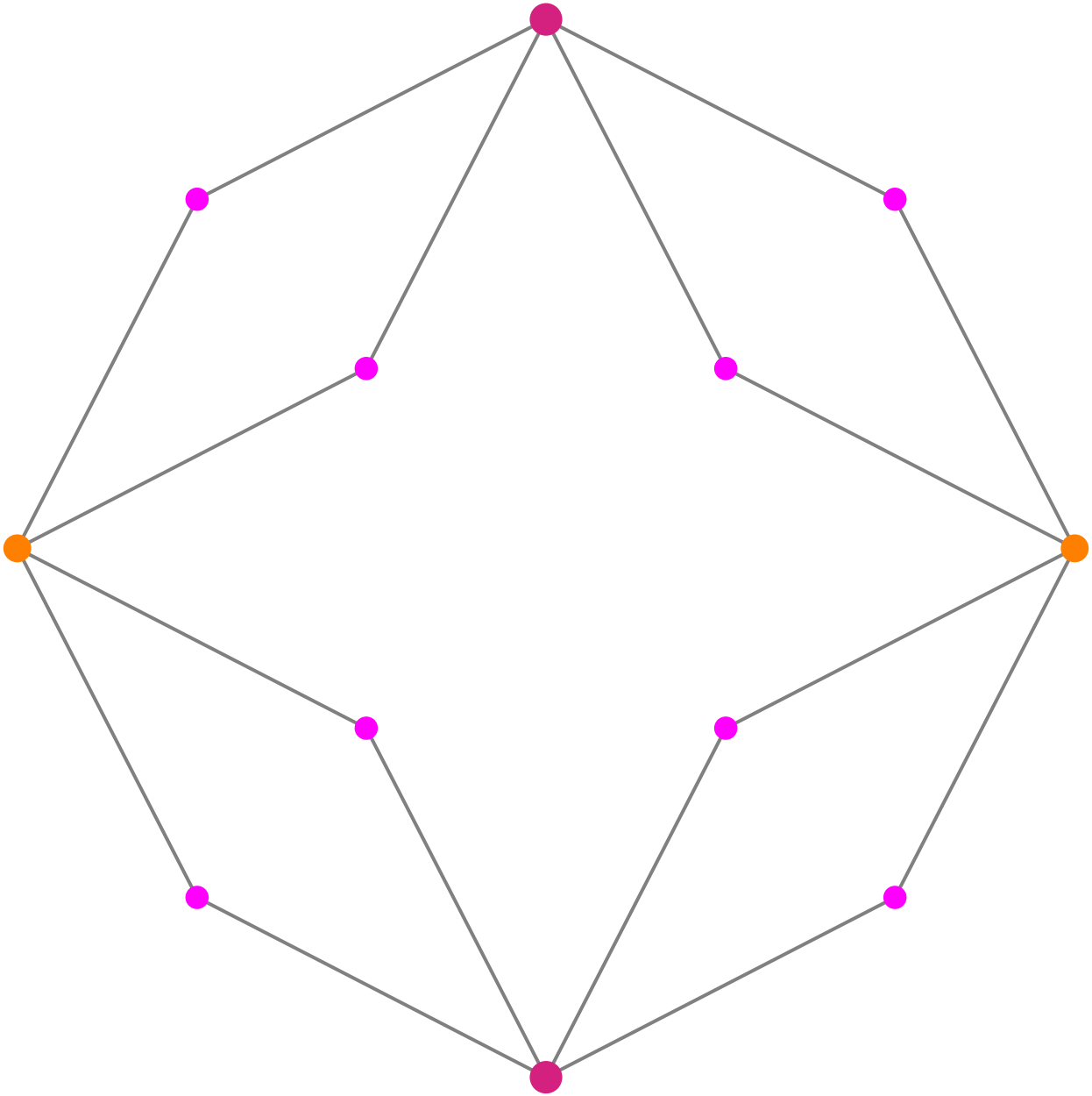
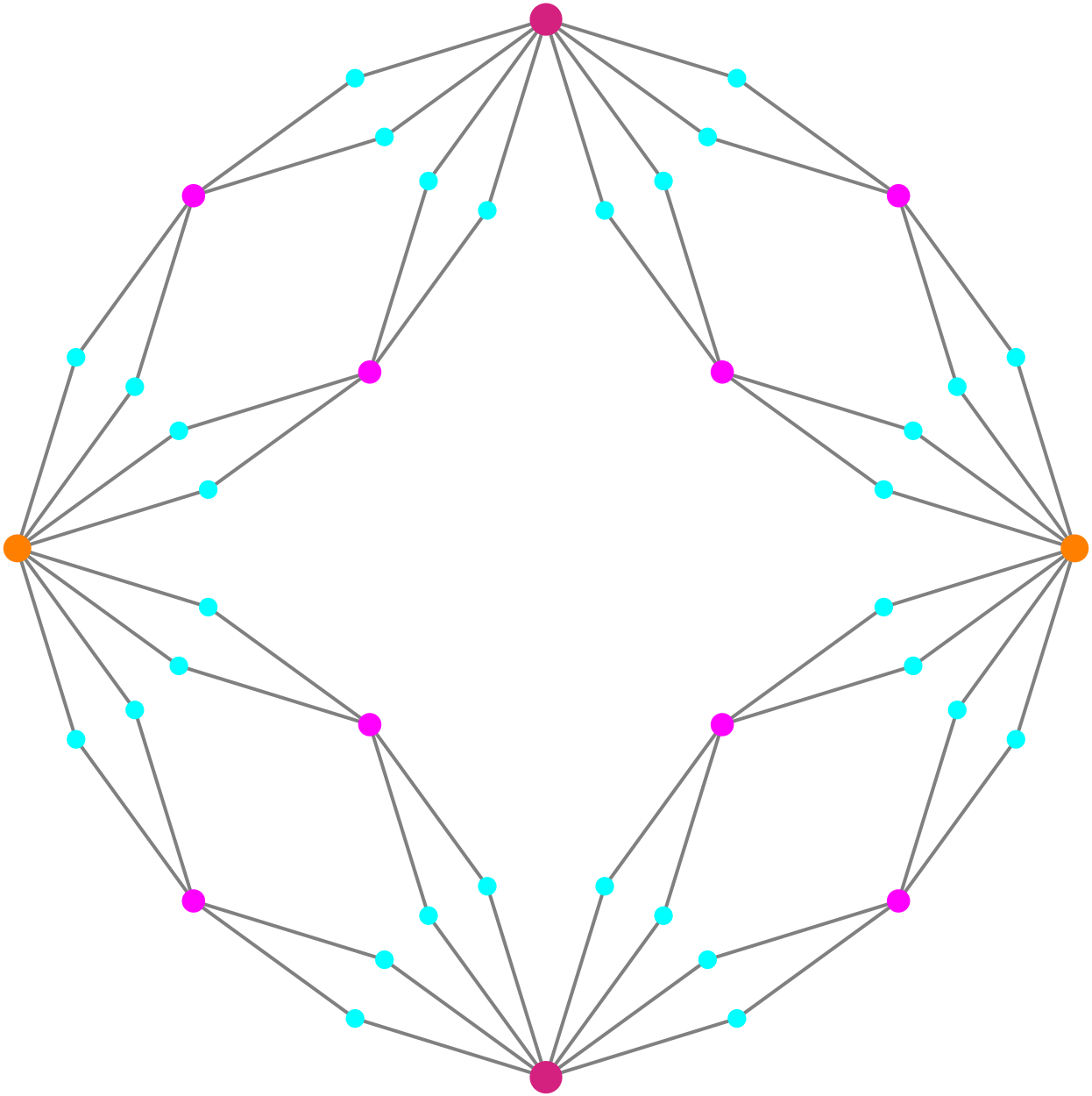
# Grupo de renormalización

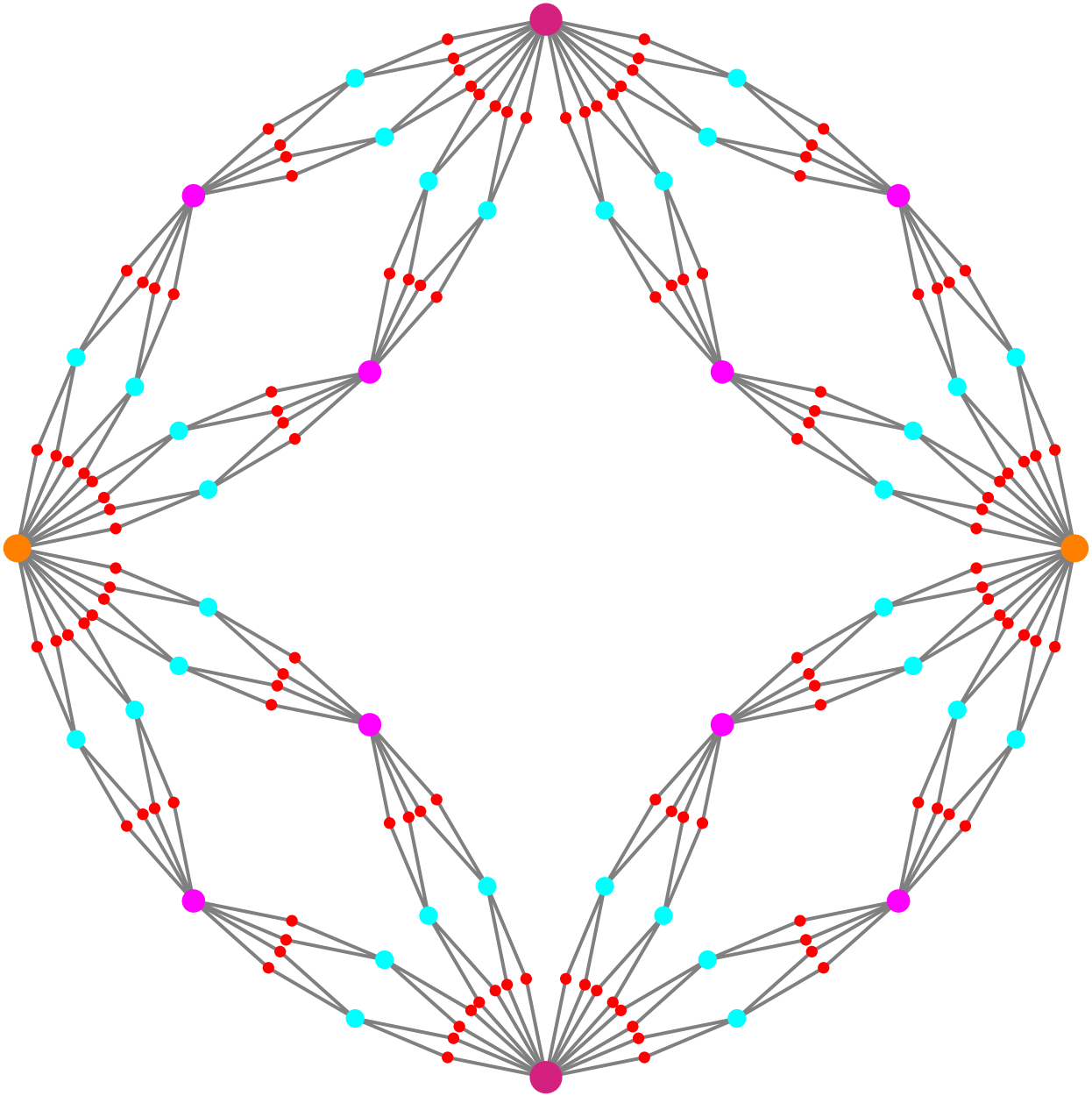


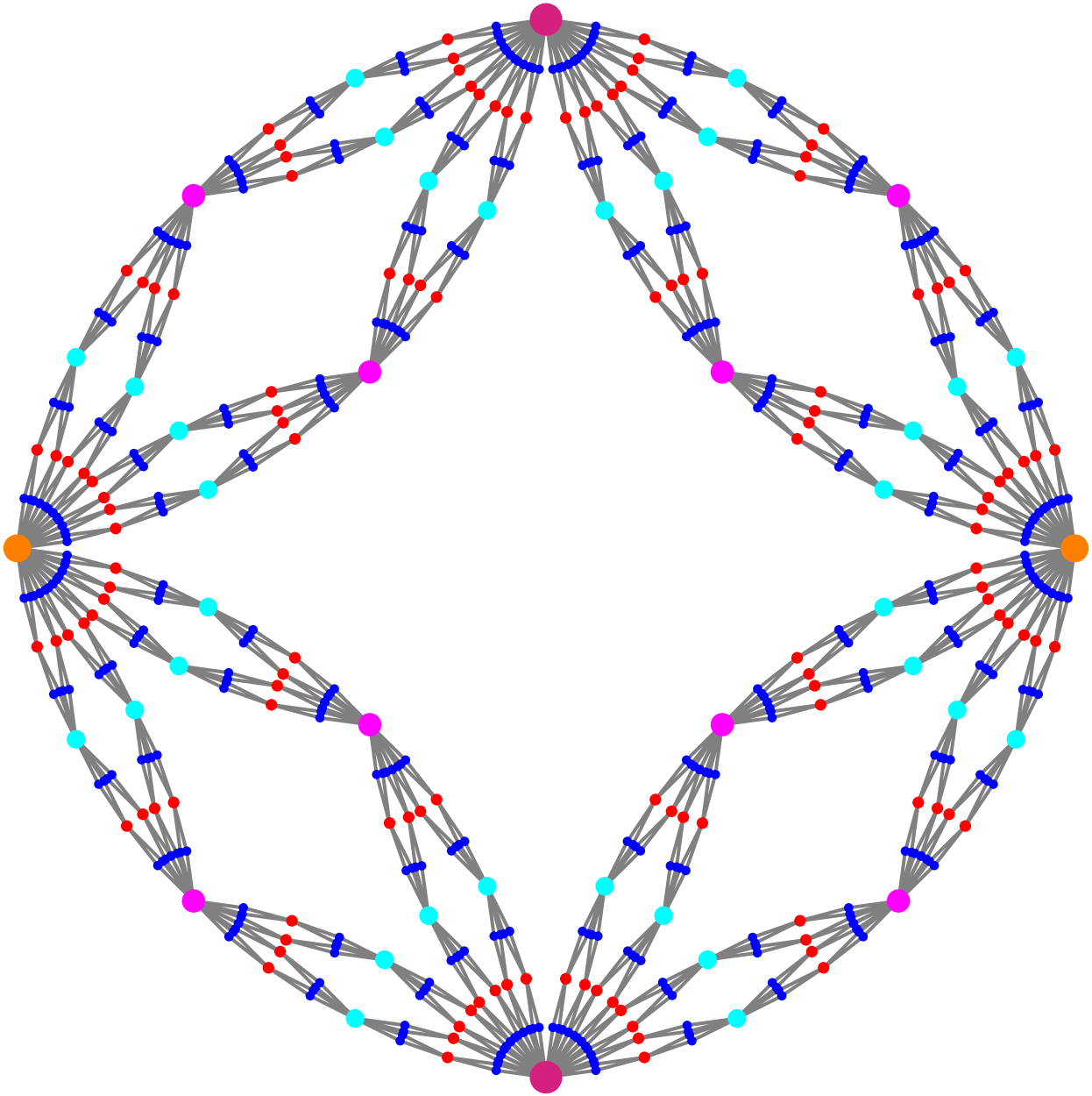
# Modelo de Ising en redes jerárquicas

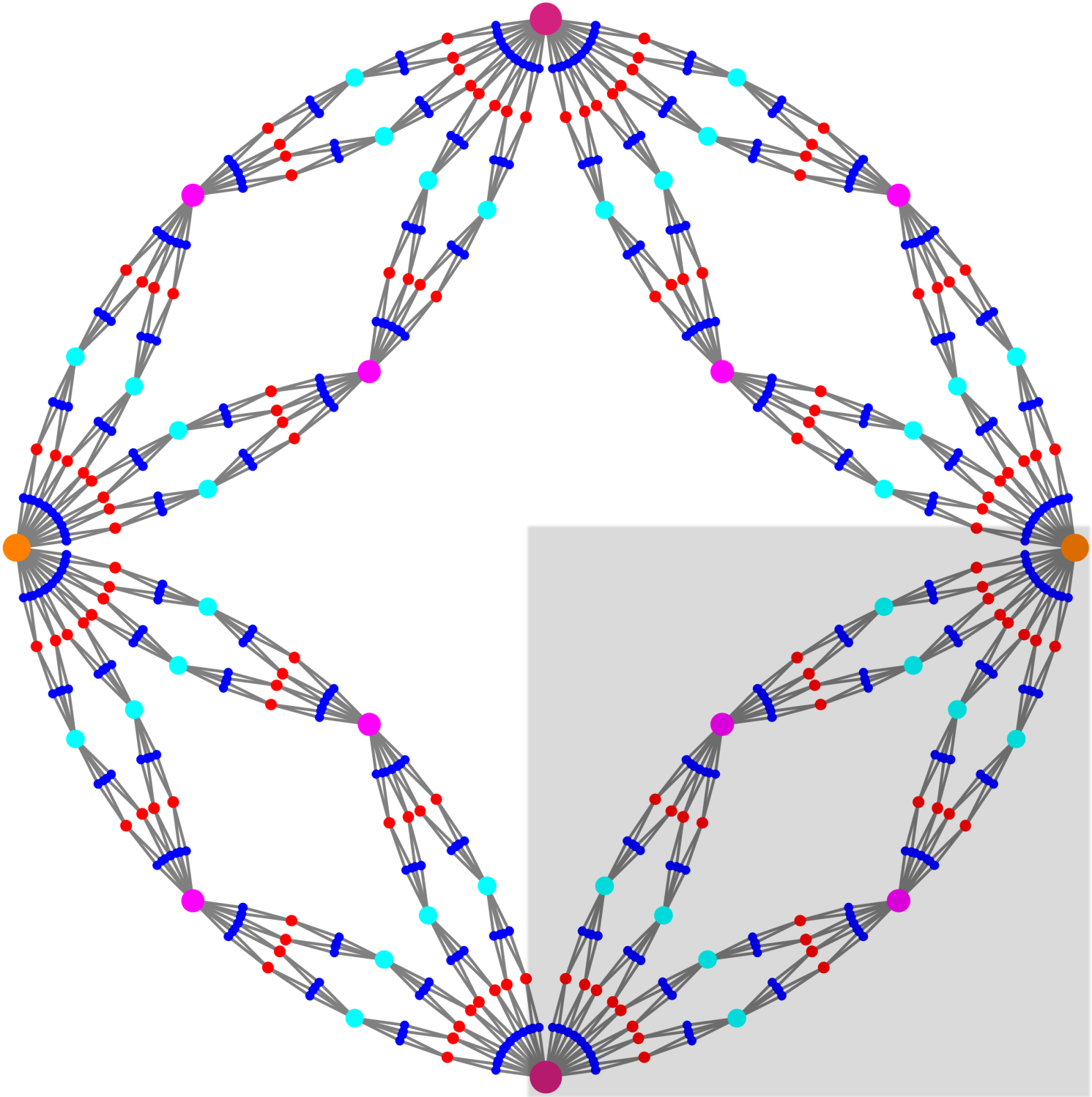


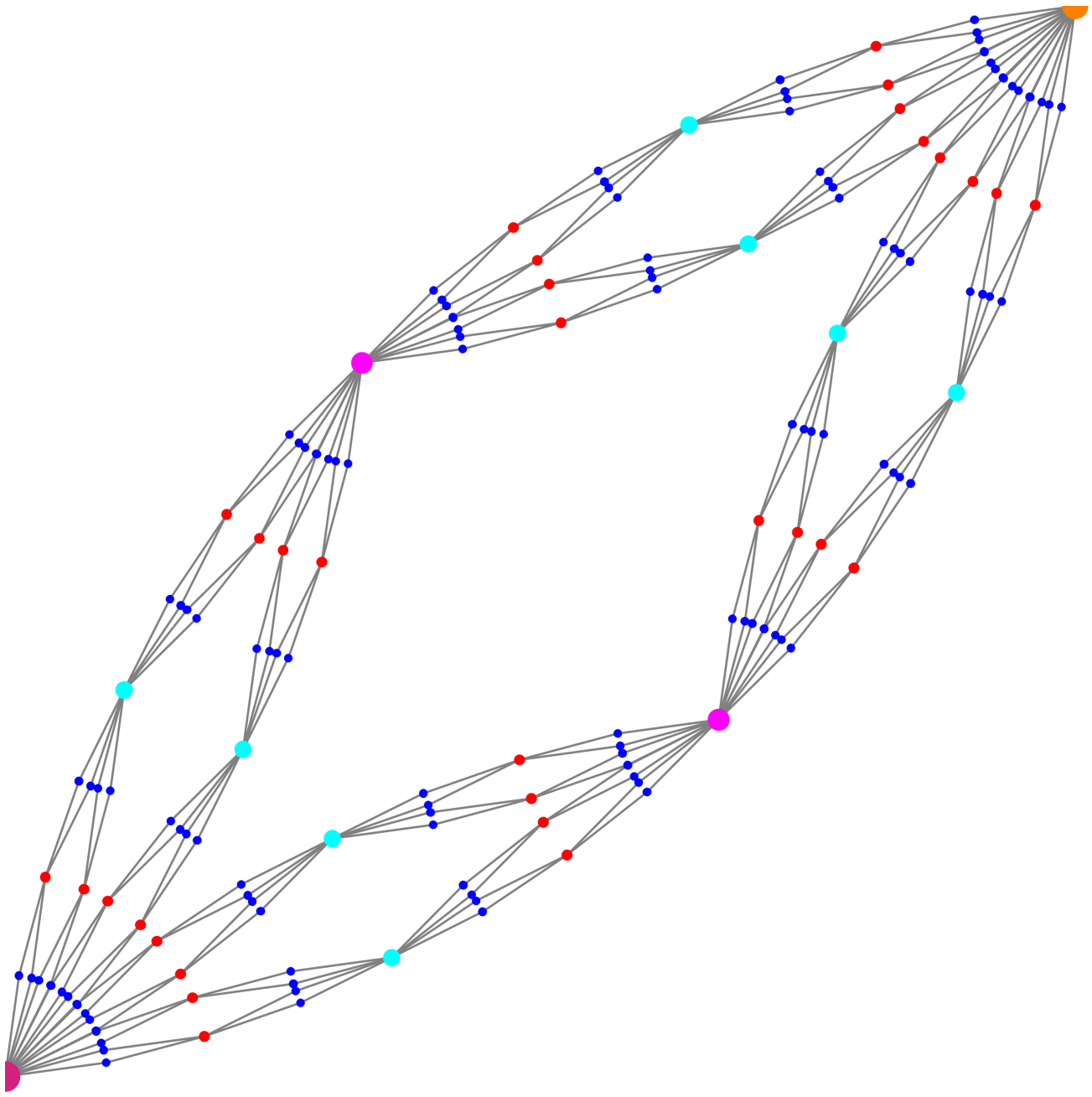




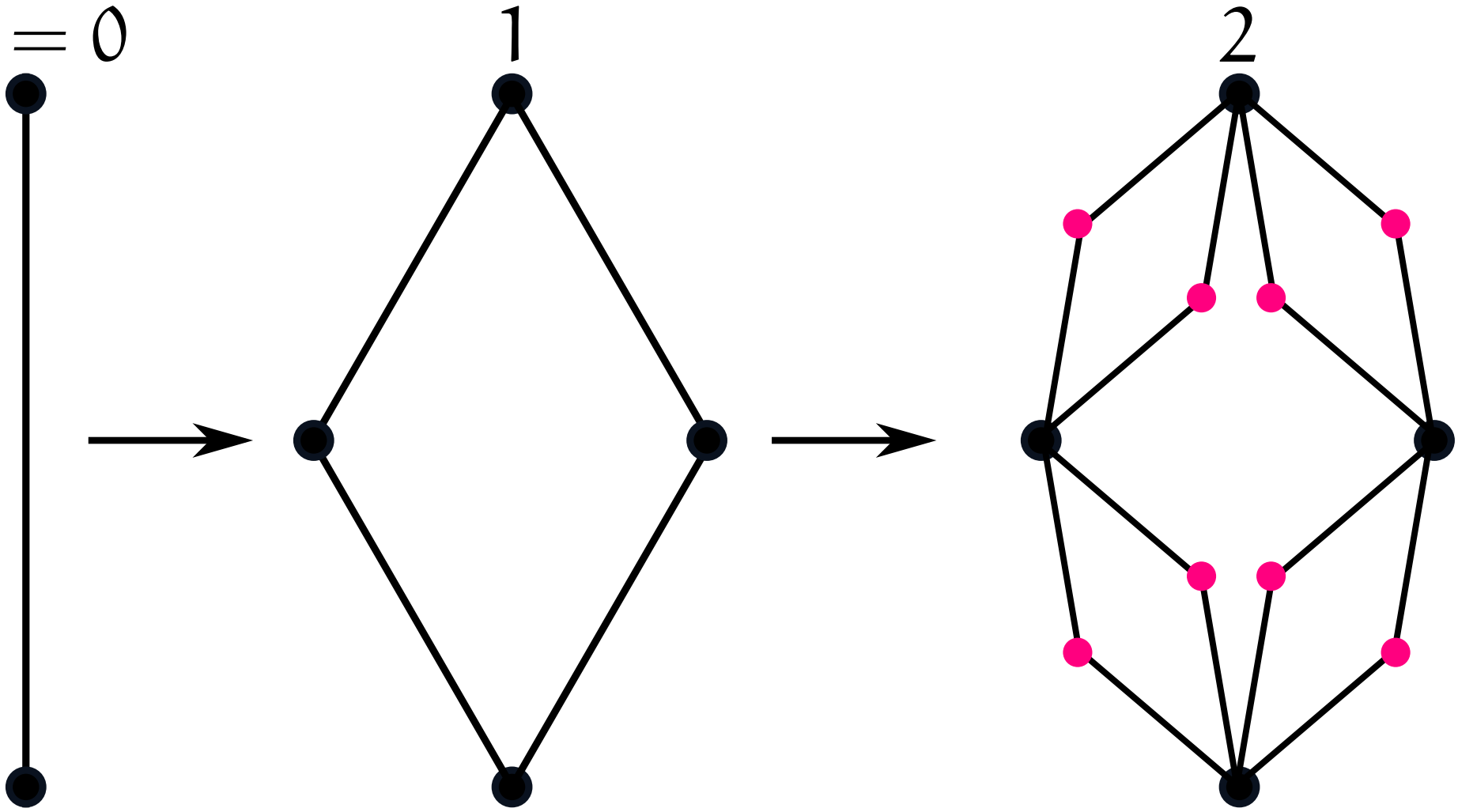




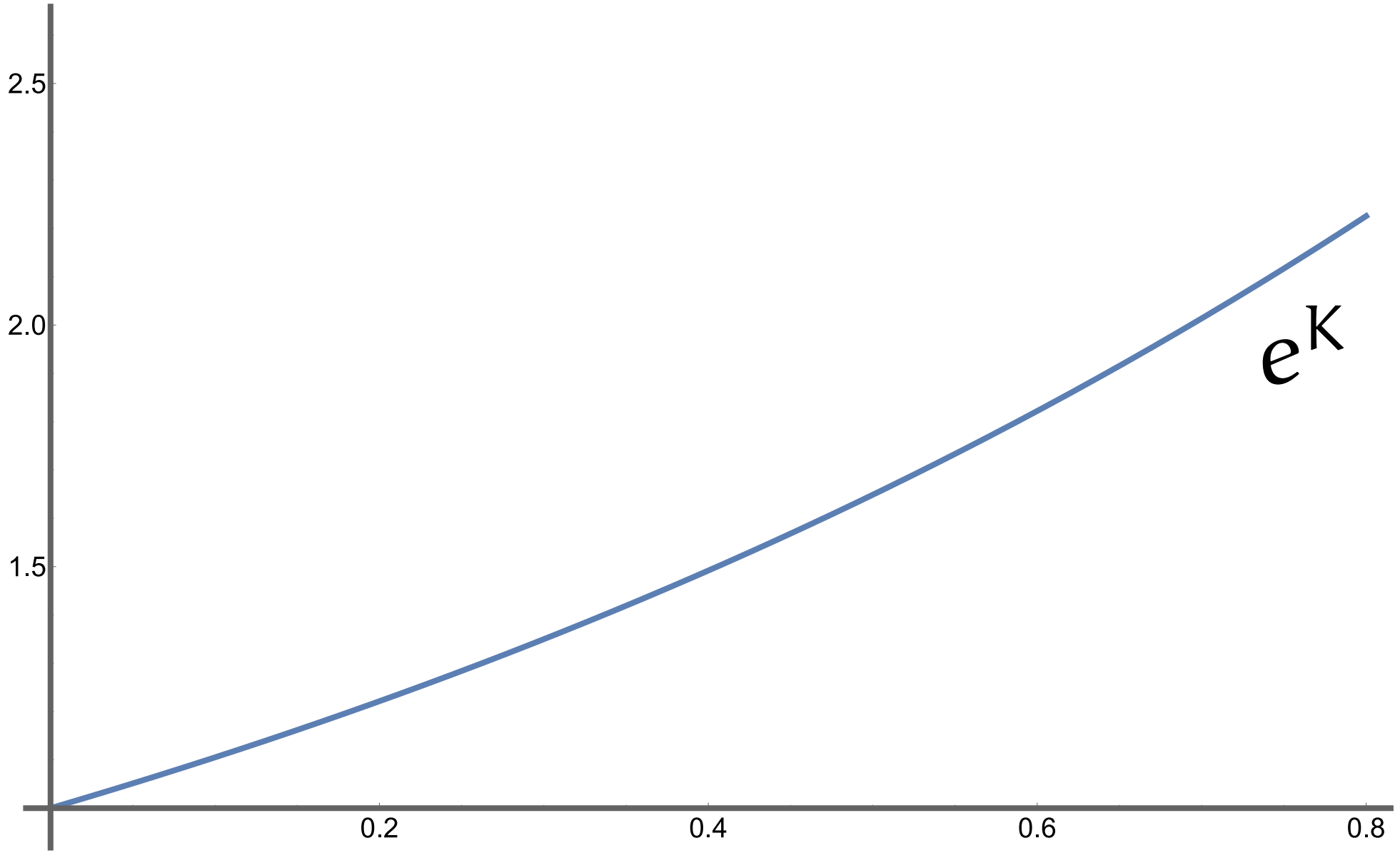


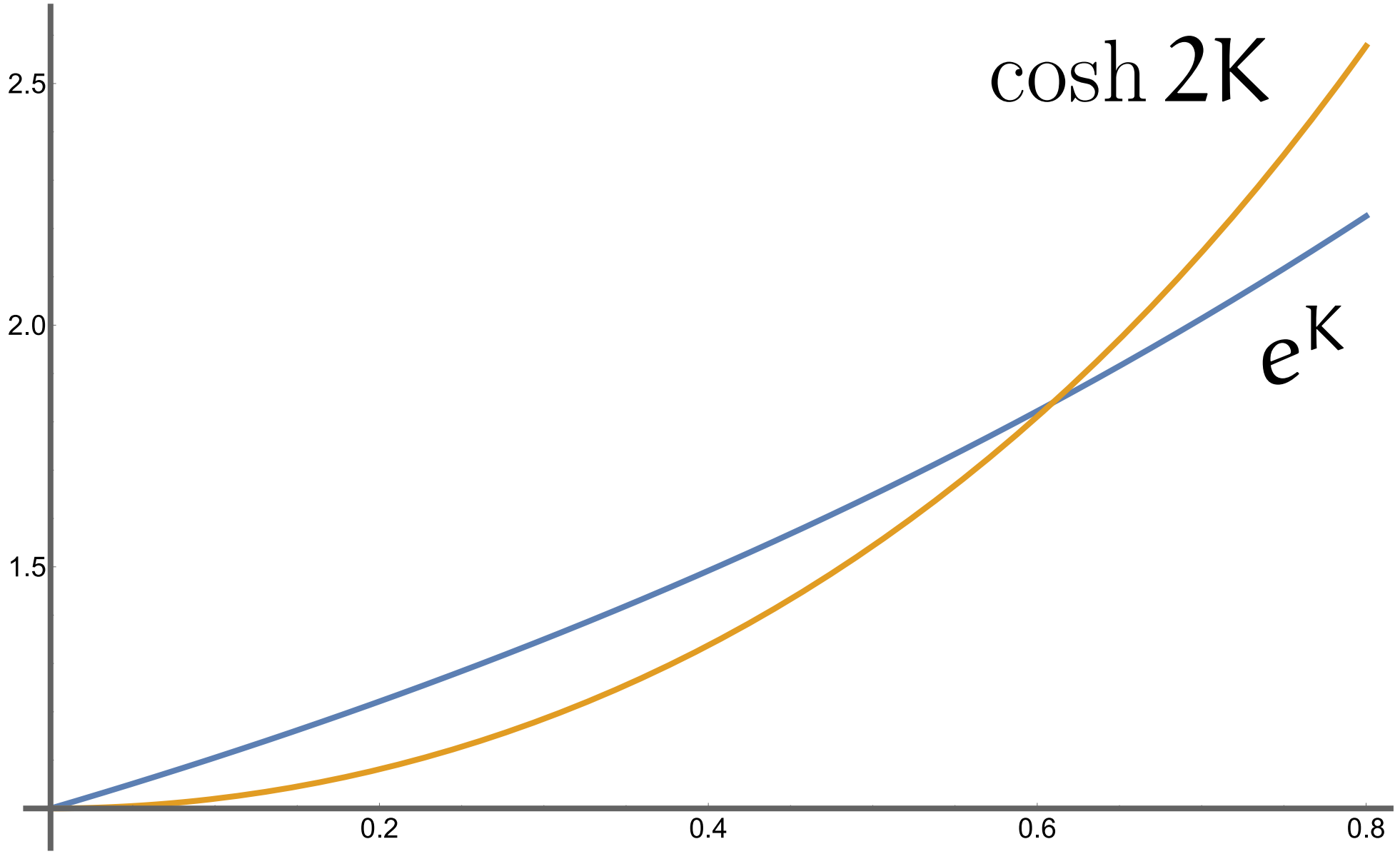


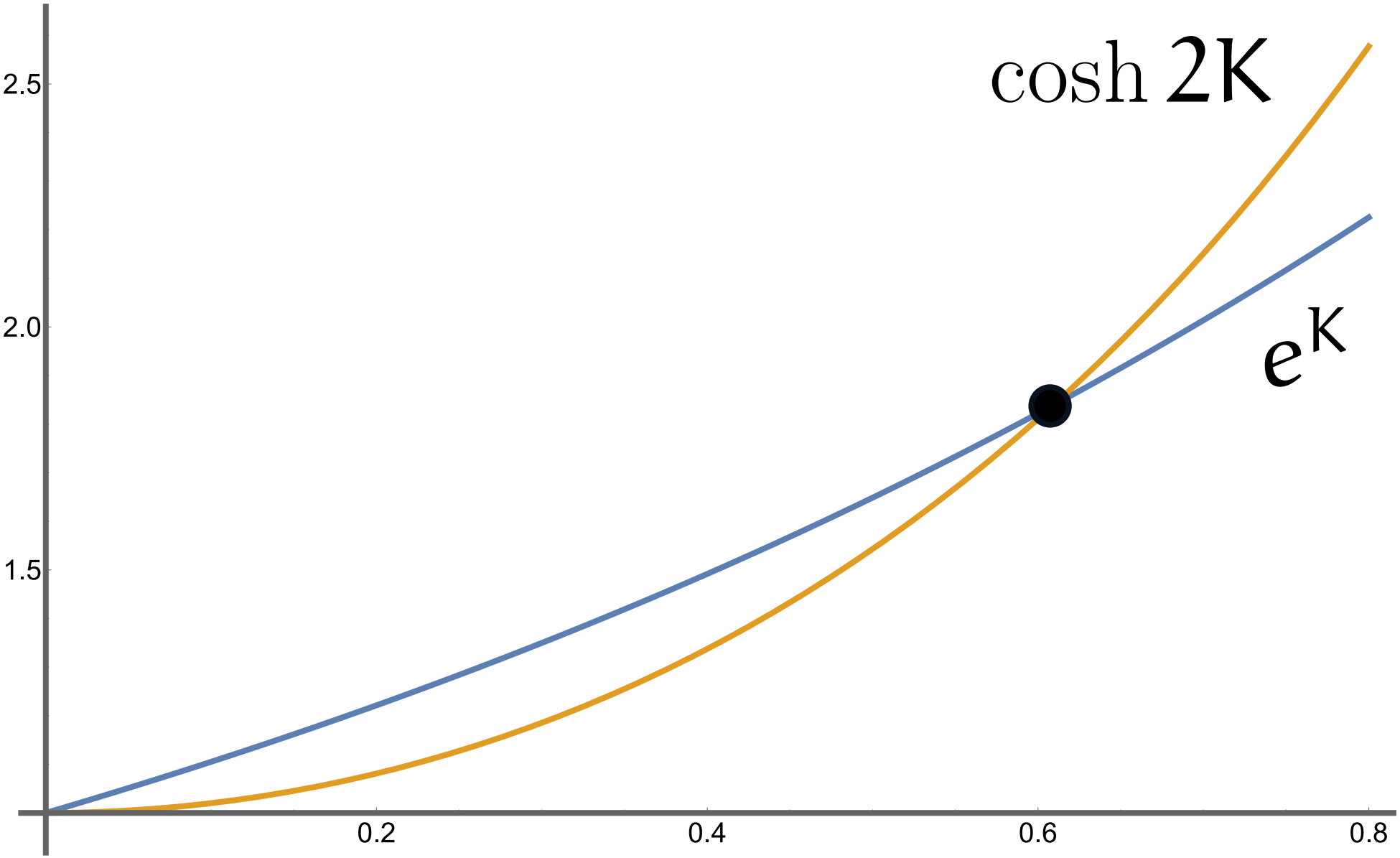
magnificación

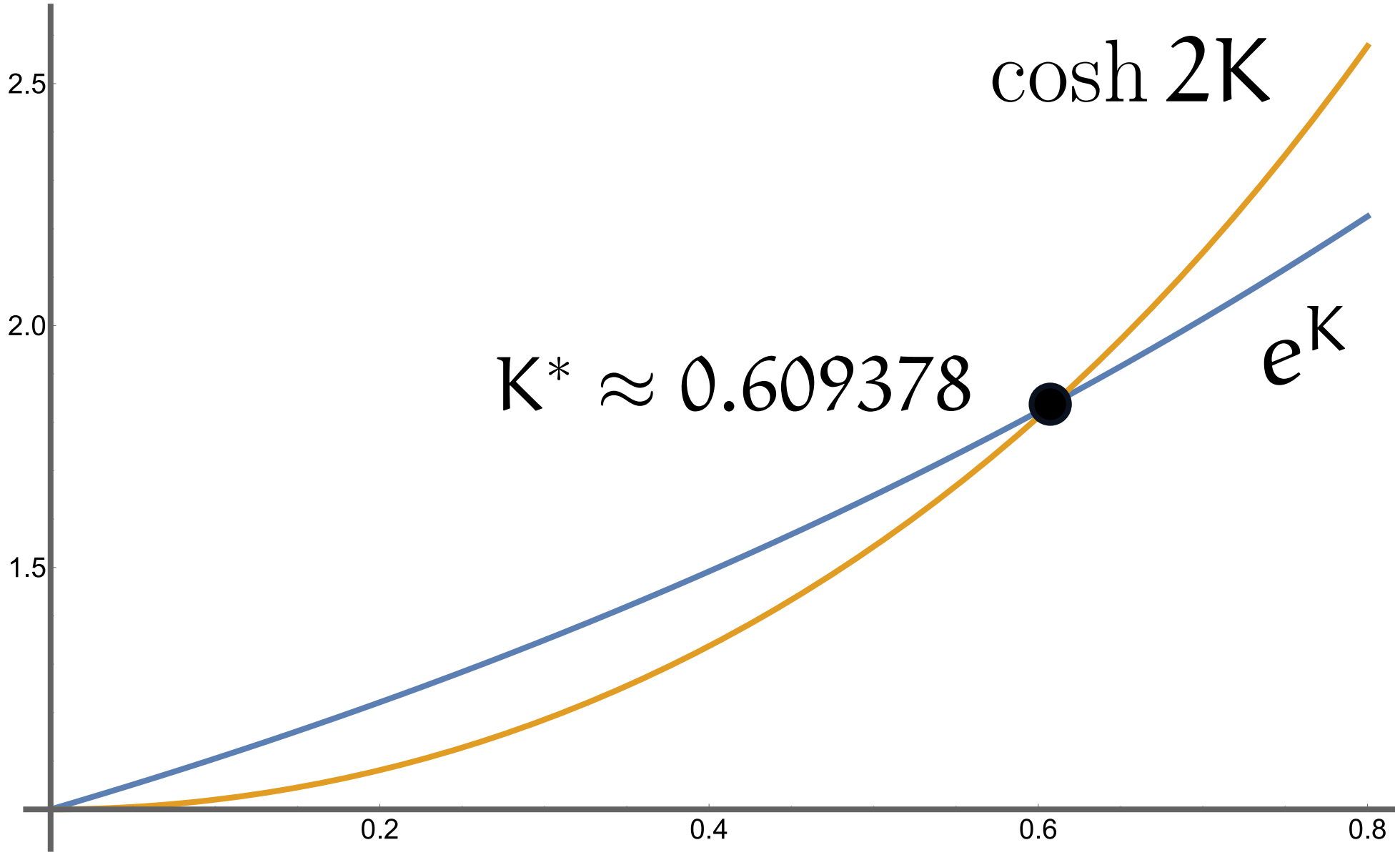



| | | |
|---|---|---|
| # espines = 2 | 4 | 12 |
| # enlaces = 1 | 4 | 16 |


2.5
2.0
1.5
0.2
0.4
0.6
0.8
$e^K$


cosh 2K
e^K
2.5
2.0
1.5
0.2
0.4
0.6
0.8


cosh 2K
e^K
2.5
2.0
1.5
0.2
0.4
0.6
0.8


cosh 2K
$K^* \approx 0.609378$
$e^K$
2.5
2.0
1.5
0.2
0.4
0.6
0.8

Función de partición para $n = 2$:

$$2048\,\text{Cosh}[2\,k]^4\left(1+\text{Cosh}[2\,\text{Log}[\text{Cosh}[2\,k]]]^2\right)$$

$$= 1804 + \frac{2}{x^{16}} + \frac{16}{x^{12}} + \frac{248}{x^8} +$$

$$\frac{880}{x^4} + 880\,x^4 + 248\,x^8 + 16\,x^{12} + 2\,x^{16}$$

Función de partición: $n = 3$:

$$8\,796\,093\,022\,208\,\text{Cosh}[2\,k]^{16}\,\text{Cosh}[2\,\text{Log}[\text{Cosh}[2\,k]]]^{4}\left(1+\text{Cosh}[2\,\text{Log}[\text{Cosh}[2\,\text{Log}[\text{Cosh}[2\,k]]]]]^{2}\right)$$

# Función de partición para $n = 3$:

$$3\,548\,913\,867\,916 + \frac{2}{x^{64}} + \frac{64}{x^{60}} + \frac{1248}{x^{56}} + \frac{17\,088}{x^{52}} + \frac{232\,176}{x^{48}} +$$
$$\frac{2\,765\,120}{x^{44}} + \frac{28\,181\,152}{x^{40}} + \frac{232\,480\,704}{x^{36}} + \frac{1\,595\,183\,672}{x^{32}} +$$
$$\frac{9\,058\,444\,096}{x^{28}} + \frac{42\,043\,615\,968}{x^{24}} + \frac{157\,163\,575\,232}{x^{20}} +$$
$$\frac{470\,449\,411\,216}{x^{16}} + \frac{1\,121\,327\,842\,368}{x^{12}} + \frac{2\,111\,620\,435\,360}{x^{8}} +$$
$$\frac{3\,108\,113\,902\,784}{x^{4}} + 3\,108\,113\,902\,784\,x^{4} + 2\,111\,620\,435\,360\,x^{8} +$$
$$1\,121\,327\,842\,368\,x^{12} + 470\,449\,411\,216\,x^{16} + 157\,163\,575\,232\,x^{20} +$$
$$42\,043\,615\,968\,x^{24} + 9\,058\,444\,096\,x^{28} + 1\,595\,183\,672\,x^{32} +$$
$$232\,480\,704\,x^{36} + 28\,181\,152\,x^{40} + 2\,765\,120\,x^{44} +$$
$$232\,176\,x^{48} + 17\,088\,x^{52} + 1248\,x^{56} + 64\,x^{60} + 2\,x^{64}$$

Función de partición para $n = 4$:

$$2^{171} \times$$

$$\text{Cosh}[2k]^{64}\,\text{Cosh}[2\,\text{Log}[\text{Cosh}[2k]]]^{16}\,\text{Cosh}[2\,\text{Log}[\text{Cosh}[2\,\text{Log}[\text{Cosh}[2k]]]]]^{4}\left(1+\text{Cosh}[2\,\text{Log}[\text{Cosh}[2\,\text{Log}[\text{Cosh}[2\,\text{Log}[\text{Cosh}[2\,\text{Log}[\text{Cosh}[2k]]]]]]]]^{2}\right)$$

Función de partición para $n = 5$:

$$
\begin{aligned}
&2^{683} \times \\
&\text{Cosh}[2k]^{256}\, \text{Cosh}[2\,\text{Log}[\text{Cosh}[2k]]]^{64} \\
&\quad \text{Cosh}[2\,\text{Log}[\text{Cosh}[2\,\text{Log}[\text{Cosh}[2k]]]]]^{16}\, \text{Cosh}[ \\
&\qquad 2\,\text{Log}[\text{Cosh}[2\,\text{Log}[\text{Cosh}[2\,\text{Log}[\text{Cosh}[2k]]]]]]]^{4} \\
&\quad \Big(1 + \text{Cosh}[2\,\text{Log}[\text{Cosh}[2\,\text{Log}[\text{Cosh}[ \\
&\qquad\qquad 2\,\text{Log}[\text{Cosh}[2\,\text{Log}[\text{Cosh}[2k]]]]]]]]^{2}\Big)
\end{aligned}
$$

# Calor específico