(1 - m*(1-e^(-i*k)) + 1/2*m*(m-1)*(1 - e^(-i*k))^2) * (1 - m*(1-e^(i*k)) +

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d/dm ((1-m (1-e^(-(...
d/dk ((1-m(k) (1-e^...
solve (1-m (1-e^(-(...
w = z^4 vs w = z^...

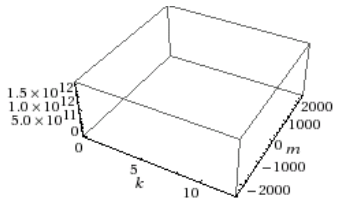
Assuming i is the imaginary unit | Use i as a variable instead

Input:

$$\left(1 - m\left(1 - e^{-i\,k}\right) + \frac{1}{2}\,m\,(m-1)\left(1 - e^{-i\,k}\right)^2\right)$$
$$\left(1 - m\left(1 - e^{i\,k}\right) + \frac{1}{2}\,m\,(m-1)\left(1 - e^{i\,k}\right)^2\right)$$

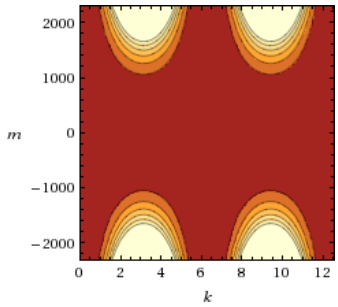
i is the imaginary unit »

3D plot: Show contour lines



Enable interactivity

Contour plot:



Enable interactivity

Alternate forms: More

$$\frac{1}{4}\left(\left(-1 + e^{-i\,k}\right)^2 m^2 + \left(1 - e^{-i\,k}\right)\left(-3 + e^{-i\,k}\right) m + 2\right)$$
$$\left(\left(-1 + e^{i\,k}\right)^2 m^2 + \left(1 - e^{i\,k}\right)\left(-3 + e^{i\,k}\right) m + 2\right)$$

Expanded form: Show steps

$$-e^{-i\,k}\,m^4 - e^{i\,k}\,m^4 + \frac{1}{4}\,e^{-2\,i\,k}\,m^4 + \frac{1}{4}\,e^{2\,i\,k}\,m^4 + 4\,e^{-i\,k}\,m^3 + 4\,e^{i\,k}\,m^3 - e^{-2\,i\,k}\,m^3 - e^{2\,i\,k}\,m^3 - 5\,e^{-i\,k}\,m^2 - 5\,e^{i\,k}\,m^2 + \frac{5}{4}\,e^{-2\,i\,k}\,m^2 + \frac{5}{4}\,e^{2\,i\,k}\,m^2 + 2\,e^{-i\,k}\,m + 2\,e^{i\,k}\,m - \frac{1}{2}\,e^{-2\,i\,k}\,m - \frac{1}{2}\,e^{2\,i\,k}\,m + \frac{3\,m^4}{4} - 6\,m^3 + \frac{15\,m^2}{4} - 3\,m + 1$$

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