Delta Behaviour

Pedro Giraldi

Delta

Call

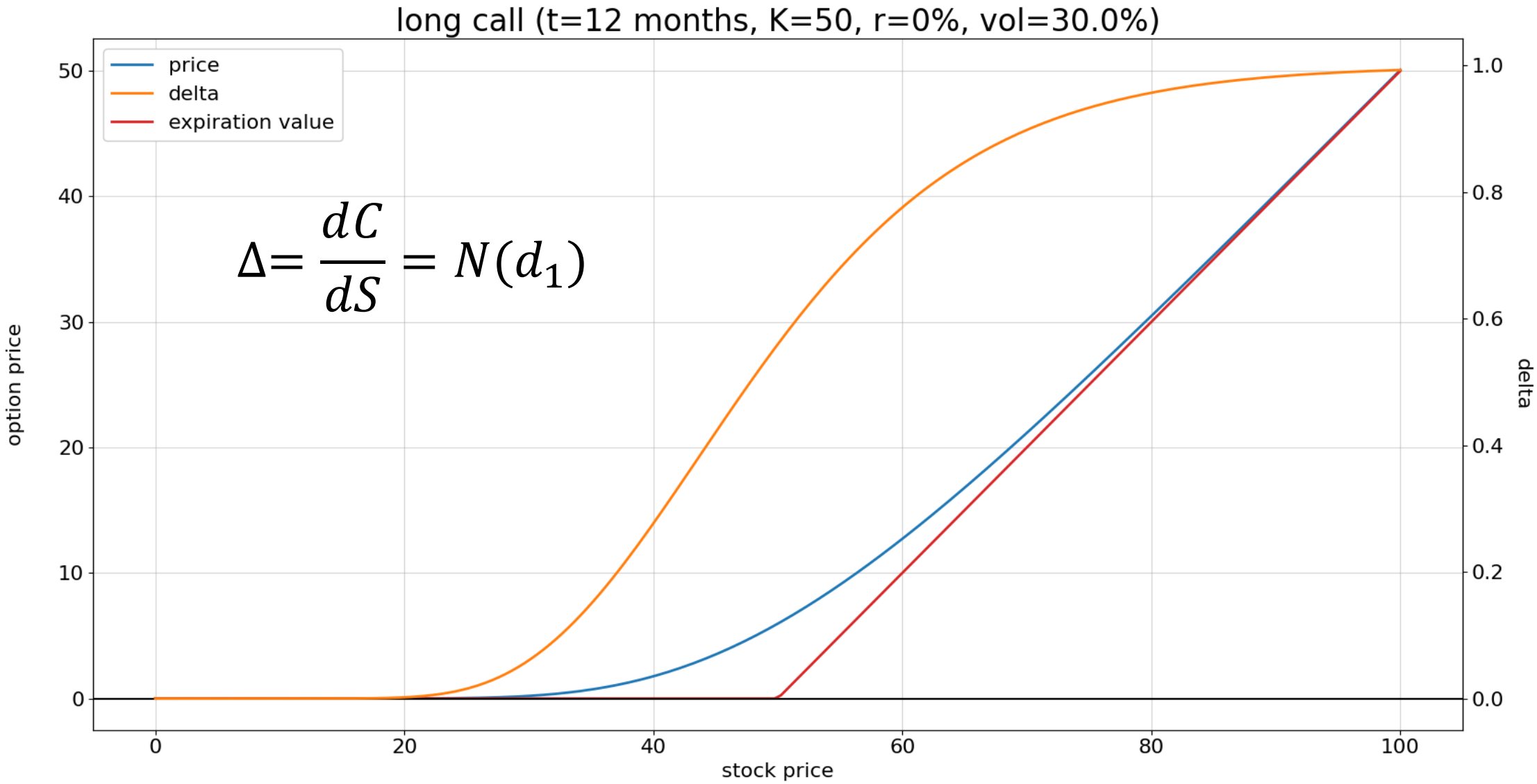
$$\Delta = \frac{dC}{dS} = N(d_1)$$

Put

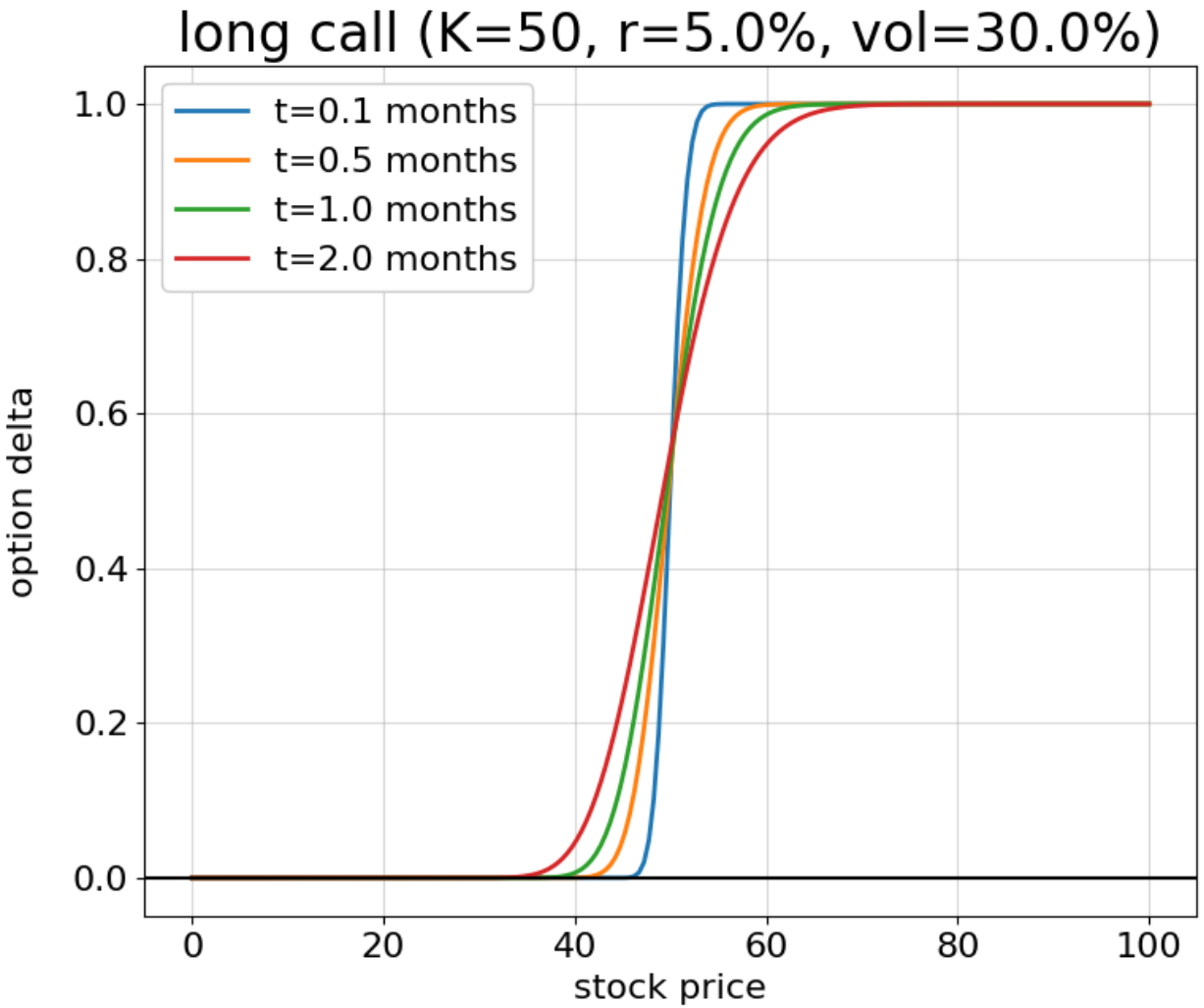
$$\Delta = \frac{dP}{dS} = N(d_1) - 1$$

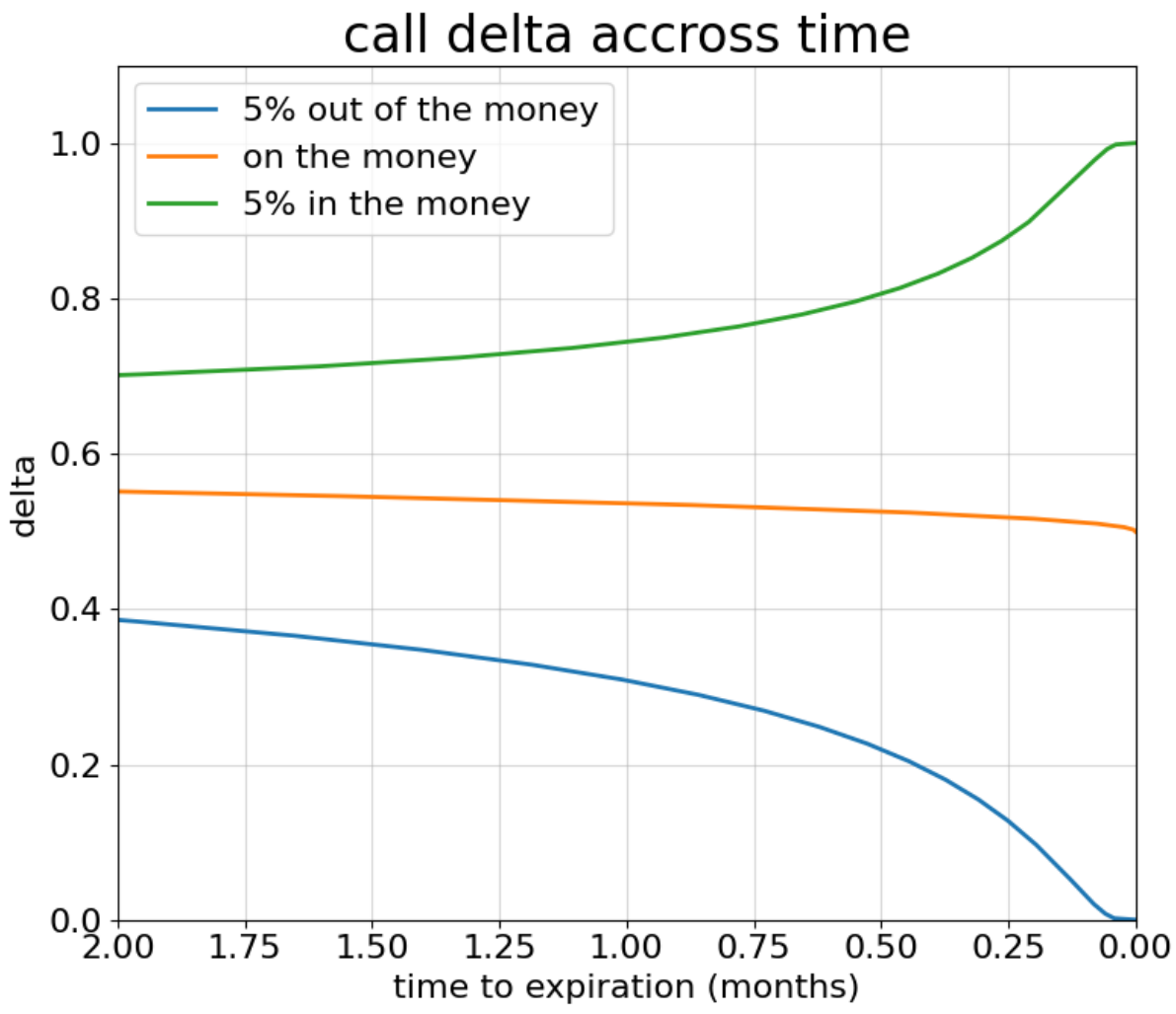
$$d_1 = \frac{\ln\left(\frac{S_0}{K}\right) + \left(r + \frac{\sigma^2}{2}\right)T}{\sigma\sqrt{T}}$$

Call Delta

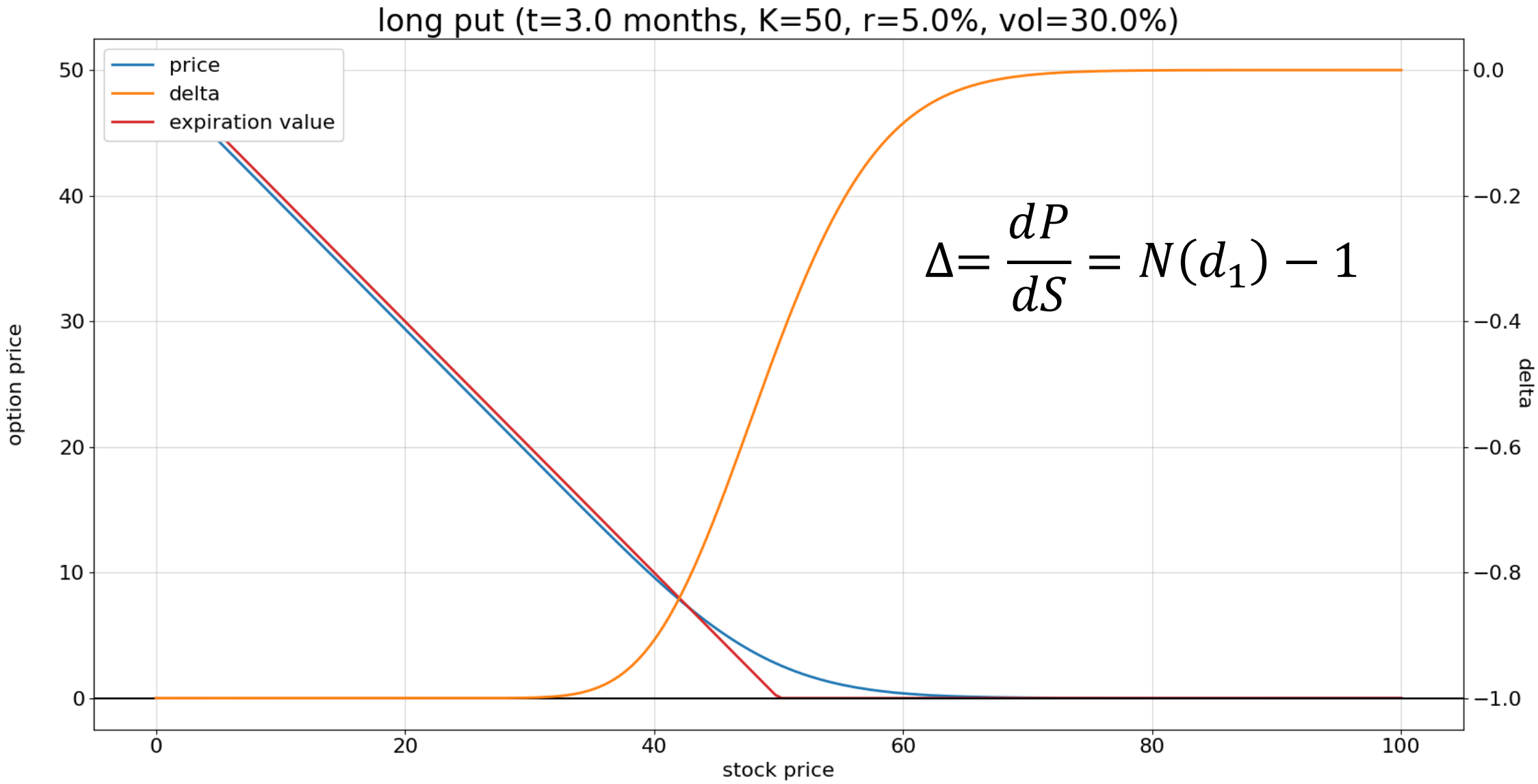

long call (t=12 months, K=50, r=0%, vol=30.0%)
price
delta
expiration value
$\Delta = \frac{dC}{dS} = N(d_1)$
option price
delta
stock price
0
10
20
30
40
50
0.0
0.2
0.4
0.6
0.8
1.0
0
20
40
60
80
100

Change in Delta accross Time

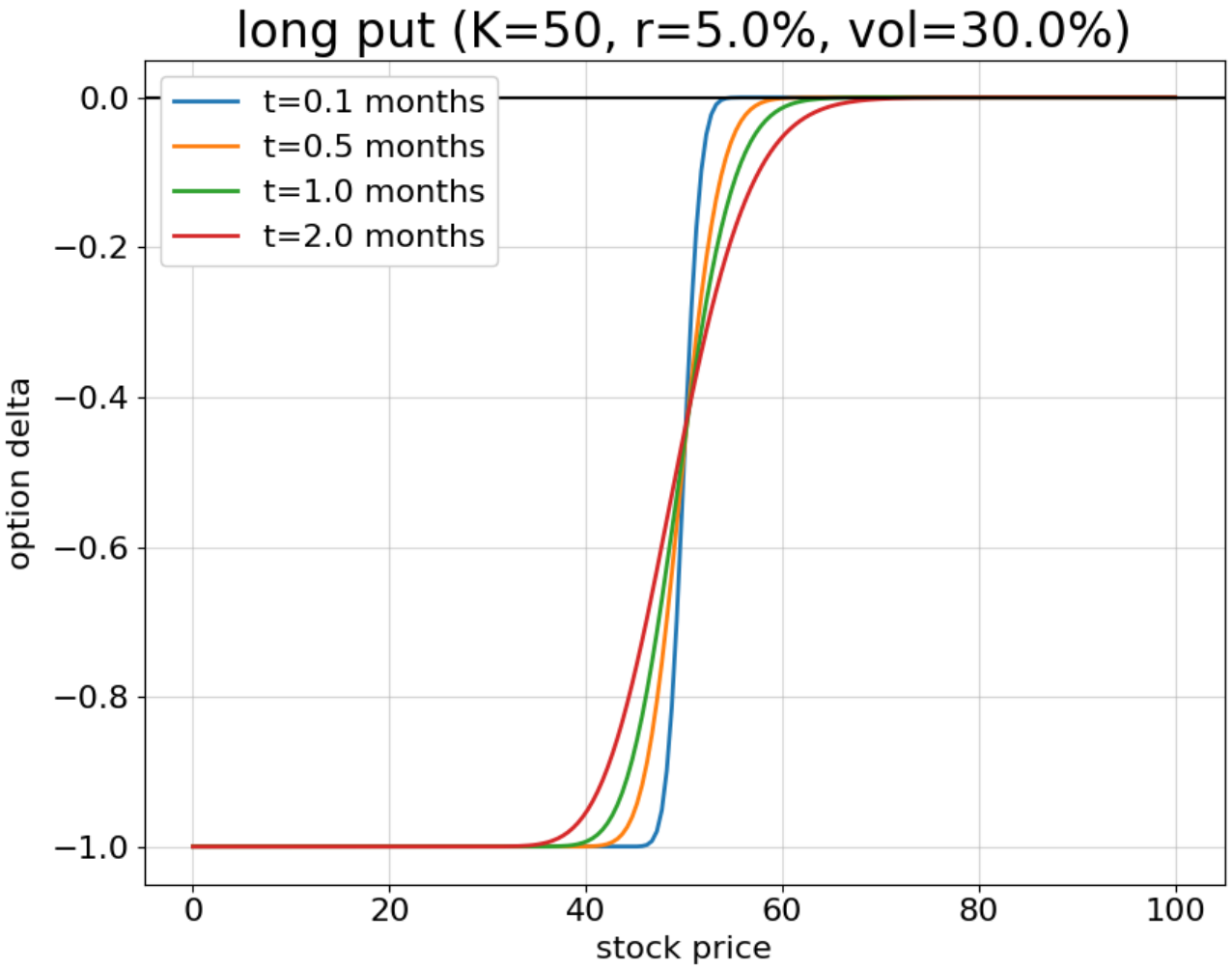


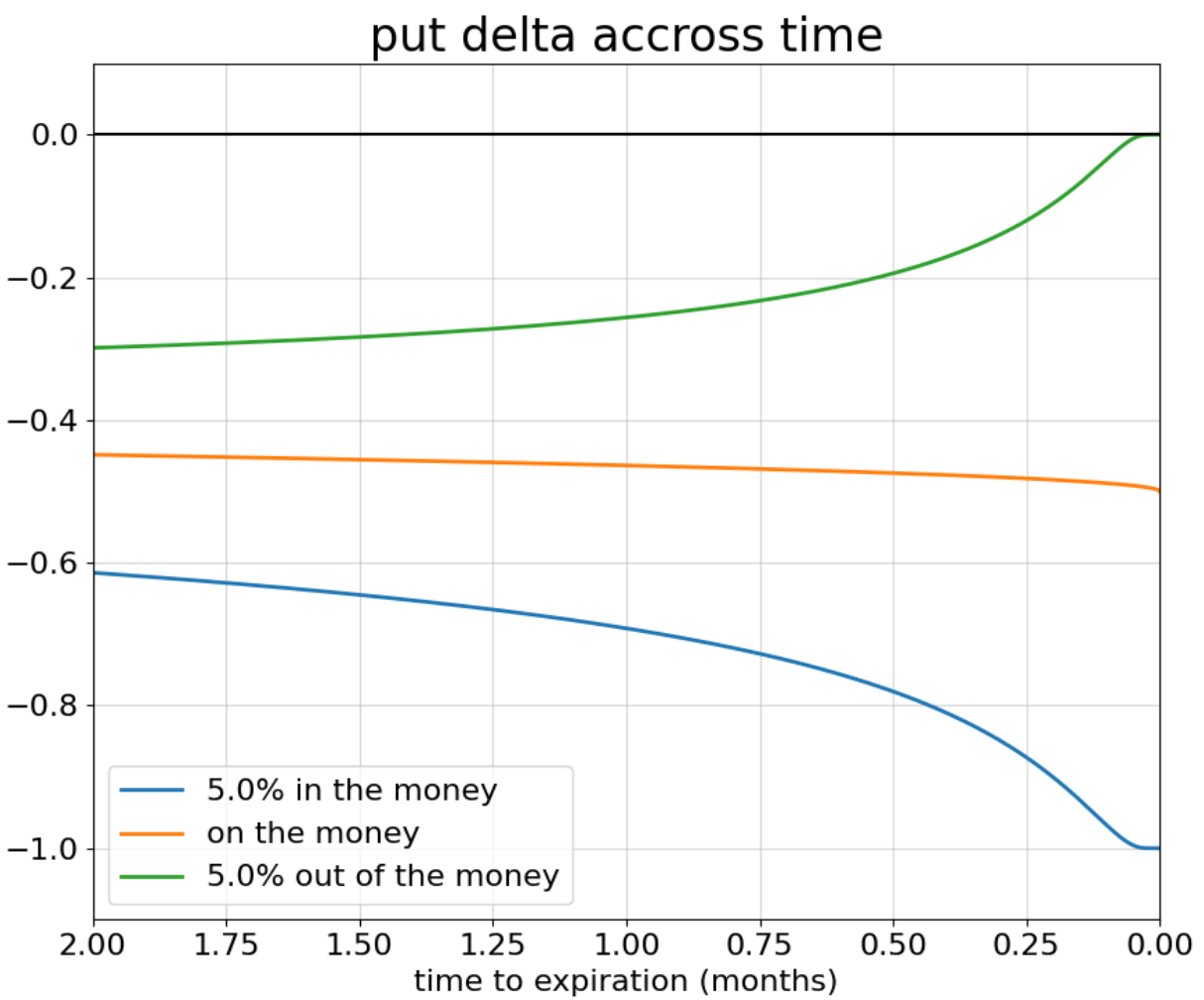


Put Delta


long put (t=3.0 months, K=50, r=5.0%, vol=30.0%)
price
delta
expiration value
option price
delta
stock price
0
10
20
30
40
50
0.0
−0.2
−0.4
−0.6
−0.8
−1.0
0
20
40
60
80
100
$\Delta = \frac{dP}{dS} = N(d_1) - 1$

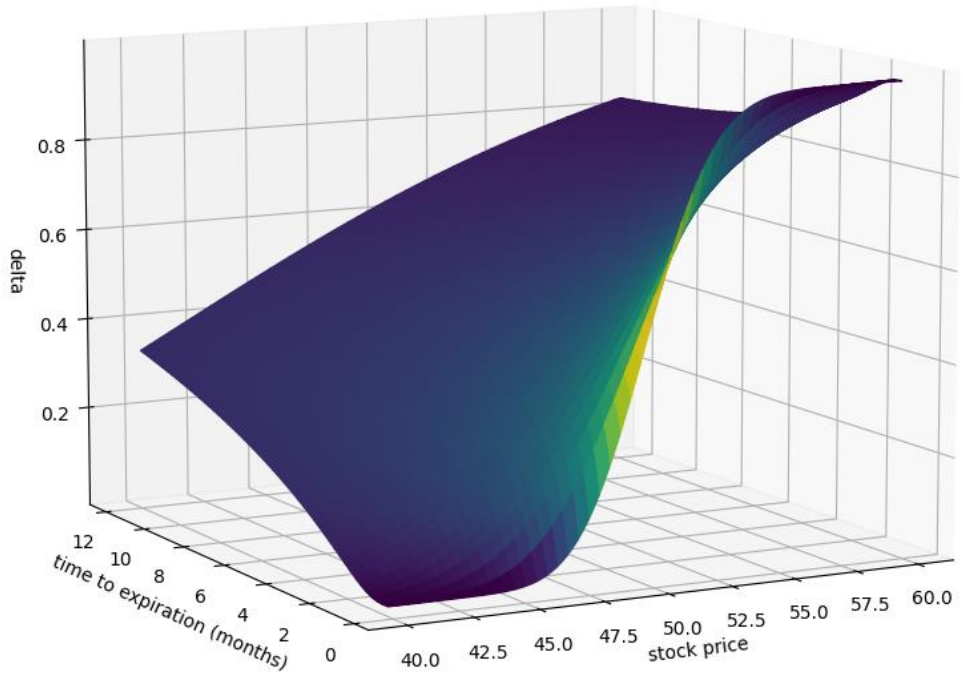
Put Delta


long put (K=50, r=5.0%, vol=30.0%)
t=0.1 months
t=0.5 months
t=1.0 months
t=2.0 months
option delta
0.0
−0.2
−0.4
−0.6
−0.8
−1.0
0
20
40
60
80
100
stock price


put delta accross time
0.0
−0.2
−0.4
−0.6
−0.8
−1.0
5.0% in the money
on the money
5.0% out of the money
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
time to expiration (months)

Change in Delta accross Time and Price

call delta for K = 50, r = 5.0%, vol = 30.0%



put delta for K = 50, r = 5.0%, vol = 30.0%