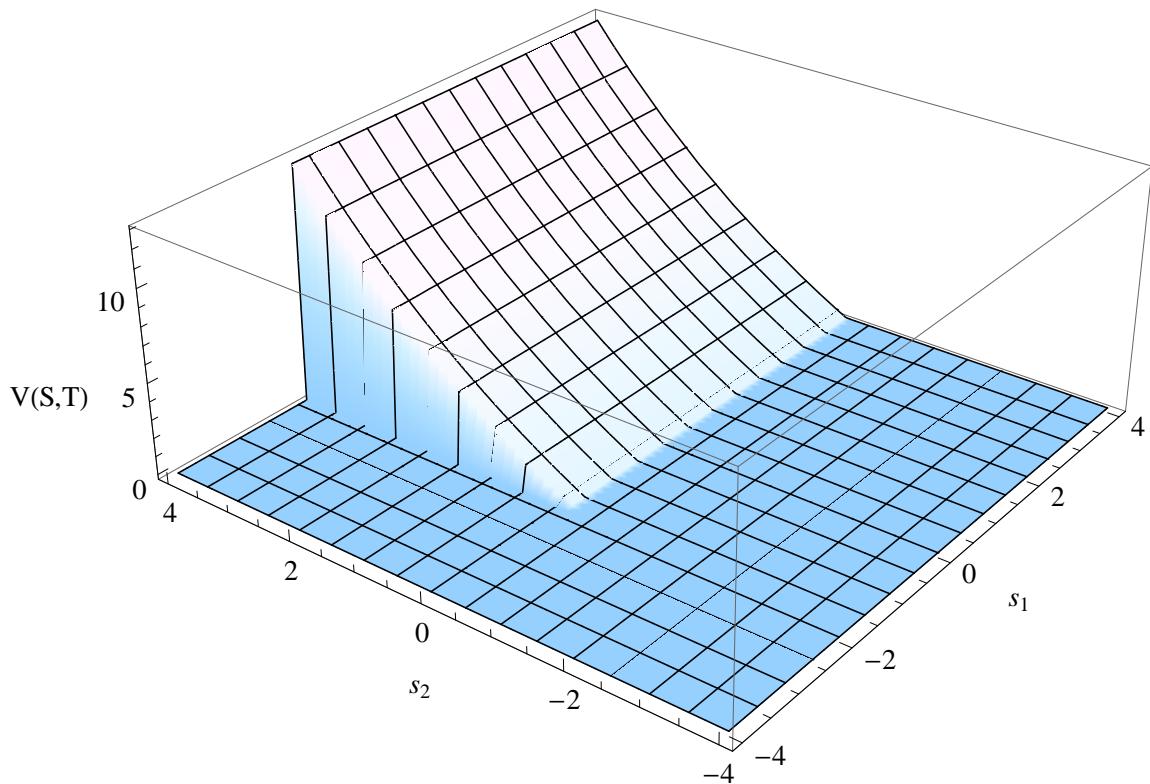


Sheet 4 - Answers

Timm & Boris

June 22, 2014

Task: 1

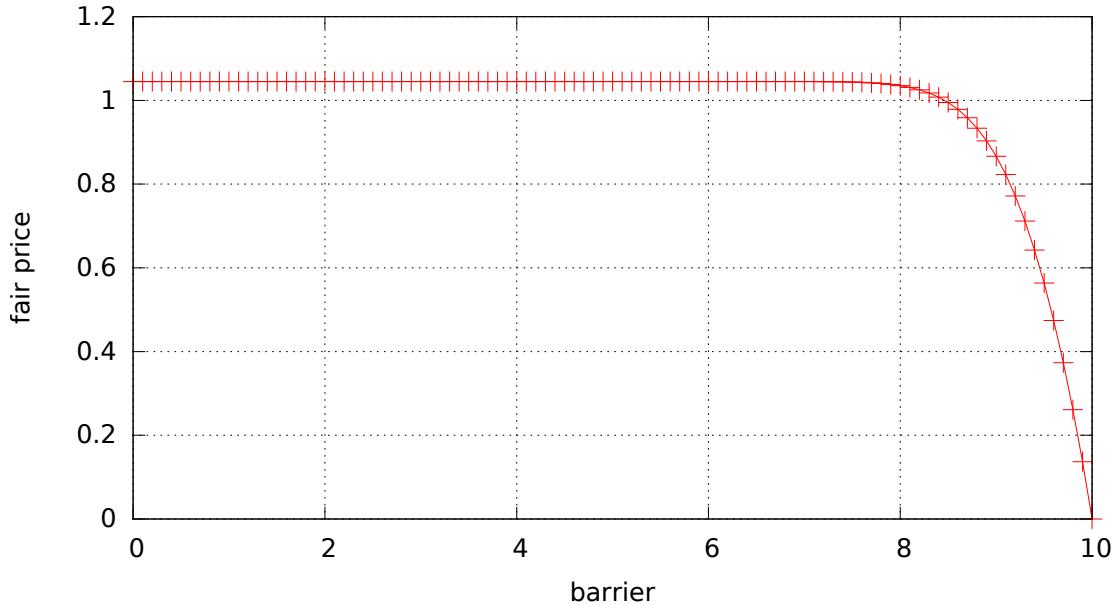


Integrand of 2-dimensional Down-Out Call option.

Task: 2

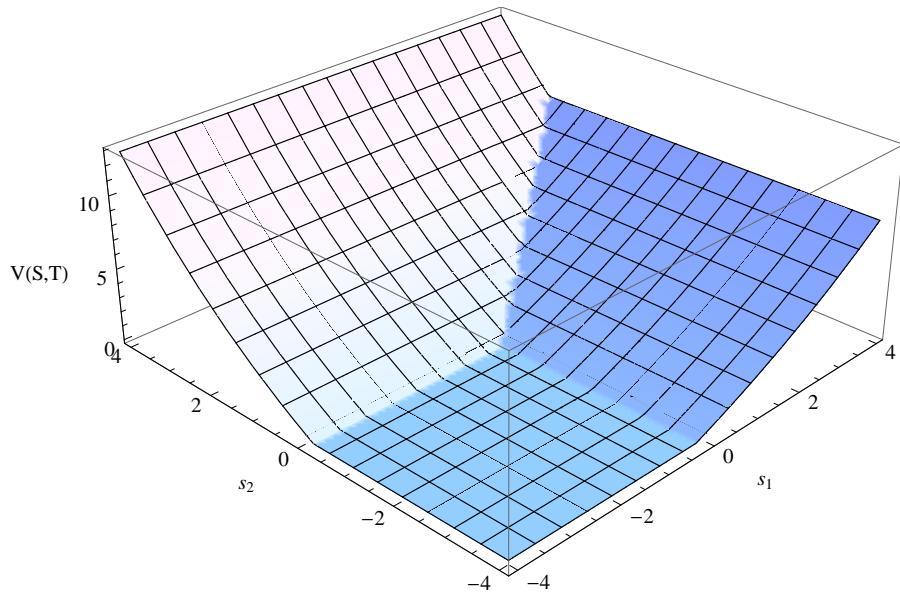
Task: 3

Plot of Down-Out Call option prices with different barriers.



Task: 4

Task: 5



Task: 6

Task: 7

Call option prices computed with Newton-Raphson algorithm with different start values σ_0 and for different actual σ ($2V/(\sqrt{T}S(0)) = 0.0975412$):

Put option prices computed with Newton-Raphson algorithm with different start values σ_0 and for different actual σ ($2V/(\sqrt{T}S(0)) = 0$):

One observed cause for the divergence of the algorithm is that the quotient σ_0/σ diverges too far from one (either is too large or too near to zero).

actual $\sigma \setminus \sigma_0$	0.0975412	0.0100000	1.0000000	10.0000000	0.1000000
0.0010000	0.0091670	0.0091670	nan	nan	0.0091670
0.0100000	0.0100000	0.0100000	nan	nan	0.0100000
1.0000000	1.0000000	nan	1.0000000	nan	1.0000000
9.0000000	9.0000000	nan	9.0000000	9.0000000	9.0000000

actual $\sigma \setminus \sigma_0$	0.0000000	0.0100000	1.0000000	10.0000000	0.1000000
0.0010000	0.0091670	0.0091670	nan	nan	0.0091670
0.0100000	0.0100000	0.0100000	nan	nan	0.0100000
1.0000000	1.0000000	nan	1.0000000	nan	1.0000000
9.0000000	9.0000000	nan	9.0000000	9.0000000	9.0000000

Task: 8

Task: 9

Volatility smile of European call options
from UBS on gold (maturity at 18.07.14)

