

Take Home Exam 2: exercise 4

Alessandro La Farciola

October 27, 2022

In this file there is the Matlab code for *Exercise 4*.

Exercise 4

In the following code, I used the functions *Call_Heston.m* and *fminsearchcon.m* for the pricing and optimization routine, respectively.

```
1 %initial parameters for the optimization
2 theta=0.04; kappa=1.5; sigma=0.3; rho=-0.6; V=0.0441;
3 par=[theta ,kappa ,sigma ,rho ,V];
4 p_opt=fminsearchcon (@Hprice ,par );
5 p_opt
6
7 function err = Hprice(x)
8     load (" Call_20050103 ")
9     call=Call_20050103 ;
10    r = 0.015; S =1202.10;
11    y=zeros (212,1) ;
12    for i = 1:212
13        y(i)=Call_Heston( call(i,2) , call(i,3)/365 , r , x(1) , x(2) , x(3) , x
14                        (4) , S , x(5));
15    end
16    err=sqrt (mean (( call (:,1)-y).^2));
17 end
```

The optimal Heston parameters given by the previous optimization are in the following table.

θ	κ	σ	ρ	V
0.0261	3.4155	0.4895	-0.6036	0.0180

Table 1: Optimal parameters for Heston model.