FE531: Assignment 1

(Due: 6 PM. Sep. 18, 2020)

Answer questions briefly and upload your document with computer codes.

1. At Sep. 30, 2019 market price of call options written on KOSPI 200 are given below:

종목	현재가	대비	시가	고가	저가	거래량	미결제
코스피200 C 201910 257.5	16.15	1.90	13.75	16.15	13.50	25	2,119
코스피200 C 201910 260.0	14.00	2.35	11.00	14.00	11.00	92	4,767

The index of KOSPI 200 is 273.55 and 91-days CD rate is 1.55%.

What is the implied volatility (IV) of each option above?

Discuss the reason if IV is not calculated.

2. Using Thomas algorithm, solve the following 6 simultaneous equations.

$$\begin{pmatrix} 1 & 2 & 0 & 0 & 0 & 0 \\ -2 & 1 & 1 & 0 & 0 & 0 \\ 0 & 0.5 & 1 & 0.5 & 0 & 0 \\ 0 & 0 & -2 & 1 & 0.5 & 0 \\ 0 & 0 & 0 & 1 & 0.2 & 0.3 \\ 0 & 0 & 0 & 0 & 1 & 1 \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \\ x_5 \\ x_6 \end{pmatrix} = \begin{pmatrix} 2 \\ -1 \\ 0.5 \\ 2.3 \\ -5 \\ 0.25 \end{pmatrix}.$$

You'd better isolate Thomas algorithm as a function. Generalize the algorithm for n simultaneous equations. Once you build the generalized version, you can call it anytime.