Basic stochastic processes: applications to finance (MVE172)

Teacher/Examiner: Simone Calogero (calogero@chalmers.se)

Course Schedule

Day	Time	Topic
Thu 26/11	8-9.45, 10-11.45	Review of the standard binomial model
Wed 2/12	8-9.45, 15.15-17	Binomial model with random risk-free rate.
Thu 3/12	8-9.45, 10-11.45	Review of the Black-Scholes model. Monte Carlo method
Wed 9/12	8-9.45, 15.15-17	Description of the projects
Thu 10/12	8-9.45, 10-11.45	Assistance with the project
Wed 16/12	8-9.45, 15.15-17	Assistance with the project
Thu 17/12	8-9.45, 10-11.45	Assistance with the project

All lectures take place on zoom. The link to connect to the lectures will be post on the course homepage the week before the lectures start.

Literature

- S. Calogero: Projects in financial mathematics (available on the course homepage)

Rules for the implementation and examination of the projects

The following rules apply to the students in the master program MPDSC

1. The projects can be found in the lecture notes. There are 5 projects available.
2. Each project is worked out in groups of max 3 students.
3. All groups have to work out the project on Asian options. In addition each group has to work on a second project, which will be different for each group. I will choose randomly the topic of the second project.
4. The names of the students in each group have to be communicated to me by e-mail no later than **Friday December 4^{th}**. Add all the members of the group as recipients. I will send an e-mail to each group on the following Monday to assign the second project.

5. Each group has to write a report with all the tasks of both projects completed. The **submission deadline for the report is January 10^{th}, 2021, at 23.59**. The reports have to be submitted by e-mail to me.

6. To pass the course each member of the group has to **individually** pass an oral examination. Members of the same group will have the exam on the same day. During the examination I will ask questions on math and finance related to the project worked out by the student. Each student in the group must be prepared to answer questions about the whole project, and not just part of it. The exam will last no longer than half an hour and will take place (on zoom) **the week 11-15 January** (the exact day will be communicated after the groups have formed).

7. In the last 3 lectures of the course I will help the groups to carry out the project tasks. No assistance will be provided outside these hours.

8. If a student does not pass the exam on January, the next opportunity will be during the re-exam week.

To all other students the following rules apply

1. The projects can be found in the lecture notes. There are 5 projects available.

2. Each project is worked out in groups of max 4 students.

3. I will choose randomly the topic of the project for each group.

4. The names of the students in each group have to be communicated to me by e-mail no later than **Friday December 4^{th}**. Add all the members of the group as recipients. I will send an e-mail to each group on the following Monday to assign the project.

5. Each group has to write a report with all the tasks of the project completed. The **submission deadline for the report is December 31^{th} at 23.59**. The reports have to be submitted by e-mail to me. On January 1^{st} I will forward all the projects to all groups, so that they can work on the next assignment.

6. Each group must also write 4 one-page documents describing and commenting the report of each other group. These 4 pages (one for each project) have to be sent to me by e-mail **no later than January 10^{th}, 2021, at 23.59**. Send each page on a separate pdf. I will subsequently forward the comments on each report to the group that wrote the report.

7. To pass the course each member of the group has to **individually** pass an oral examination. During the examination I will ask questions on math and finance related to the project worked out by the student. Each student in the group must be prepared to answer questions about the whole project, and not just part of it. The exam will last no longer than half an hour and will take place (on zoom) **the week 11-15 January** (the exact day will be communicated after the groups have formed)

8. In the last 3 lectures of the course I will help the groups to carry out the project tasks. No assistance will be provided outside these hours.

9. If a student does not pass the exam on January, the next opportunity will be during the re-exam week.

Remark: It is left to each group to organize how to work in team and, at the same time, follow the recommendations on social distance.

Remark (on the structure of the report): In the course homepage you can find a suggested template to write the report (in LaTex). The report consists of two parts. The first part contains the solutions of the written exercises of the project. In the second part you should include and explain the plots requested in the Matlab task. You do not need to explain the theoretical background behind the results you have obtained (you might want to write some relevant equations, if you find it useful). These two parts together should consist of no more than 10 pages and no less than 5. Include an appendix with your Matlab codes.