

To: WBF Finite Difference Course Participants
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St: Level 1
Dt: 10 May 2023

Agenda

The course is primarily built around the article ‘Fun with Finite Difference’. It makes good sense to read the article before start of the course.

We provide supplementary material ‘Finite Difference Method for Financial Problems 0-4’ for the reader who likes a deeper dive.

On level 1 we will start by going through the theory of the theta solver and how it is coded.

We will then actually code it, fire it up and do some basic tests.

To Do

- 1/ Code methods `kFiniteDifference::dx()` and `::dxx()` that compute the operators $\delta_x^+, \delta_x^-, \delta_x, \delta_{xx}$ as compact tridiagonal matrixes.
- 2/ Code `kFd1d::calcAx()`, that computes the operator $I + \theta \Delta t \bar{A}$ as a tridiagonal matrix.
- 3/ Code `kMatrixAlgebra::tridag()`. Use `NRC::tridag()` as inspiration.
- 4/ Code `kMatrixAlgebra::banmul()`. Don’t use `NRC::banmul()` as inspiration.
- 5/ Code `kFd1d::rollFwd()`. Use `kFd1d::rollBwd()` as inspiration.
- 6/ Test duality for the backward and forward solution from Excel. Use the Excel function `xFd1d()`.