

# ATFM Fall Term 2022/23

NMFM507 Advanced Topics of Financial Management

NMFM507 Pokročilé partie finančního managementu

Technical paragraph

## Introduction

### Introductory and technical notes

1. The ideas and methods presented in this course are useful in a world with prevailing rational economic behavior. This is unfortunately not the case of the European Union and many other countries worldwide nowadays.

2a. Theoretical parts will be available at my web page in PDF files. Numerical illustrations will be presented in Wolfram Language (WL, often known as Mathematica), \*.nb files. The use of WL chosen for this course enables to make interactive presentations, provide and analyze up to date information from financial markets and, in the main, efficiently to simply model varieties of of financial, insurance, and economic problems.

2b. Some knowledge of WL is an advantage but not the necessity. The installation instructions as well as simple hints for use of WL in this course without any previous knowledge of the system follow.

3. The students who did not pass the courses Introduction to Finance and Financial Management in Bc syllabus are recommended to have a look at the Basics of Financial Mathematics available here:

<http://www2.karlin.mff.cuni.cz/~hurt/BasicsOfFinMat.pdf>

It deals with basic notions, notation and terminology used in this course. A small part of the material is written partly in Czech but the understanding of the essence of the text is language independent.

4. Installation instructions for Mathematica:

[http://www2.karlin.mff.cuni.cz/~hurt/Mathematica\\_Installation\\_Students.pdf](http://www2.karlin.mff.cuni.cz/~hurt/Mathematica_Installation_Students.pdf)

5. Majority of students here understand Czech. Please do not hesitate to ask in Czech or Slovak but not in Swahili (I only understand “tutaonana” which means “See you later.”)

How to read and understand Wolfram Language files

2. Designed for students who did not pass the course Mathematica for the beginners:

2.1. To study and analyze examples in the Mathematica notebook you need only the knowledge how to:

2.1.1. Open the cells (double click on the blue bracket of the cell right). Mathematica notebook is divided in Sections, Subsections, Subsubsections, Input cells (by default grouped with the results, output cells), ... . These cells are automatically grouped in higher levels. See also the following Subsub-section Cell Groups and Outlining.

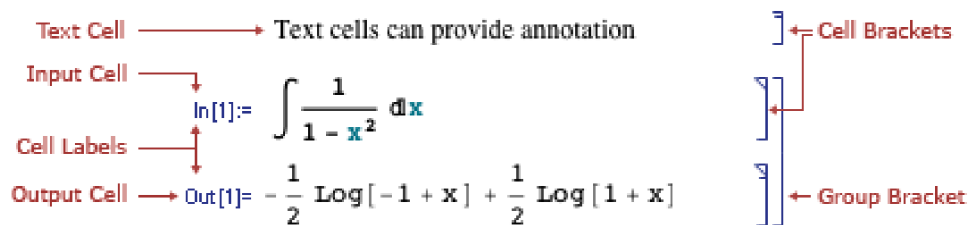
2.1.2. Initialization of the cells or starting calculations is realized by `SHIFT+ENTER` or `ENTER` on the numerical keyboard. (On Mac `SHIFT+RET`) Symbols, variables, that are not defined in the current notebook or are unknown in the system shine blue.

Further very useful pieces of information are on the Slavík pages (only Czech):

<https://www2.karlin.mff.cuni.cz/~slavik/info.html>

and also: [An Elementary Introduction to the Wolfram Language](#)

## Cell Groups and Outlining



double-click a group bracket — open or close a cell group

double-click cell brackets — close all other cells in a group

triple-click — select a function and its arguments

Subscript (`CTRL` + `_`):  $x_n$  ▪ Special Character ▪ Convert to StandardForm ▪ Why the Coloring? ▪

Superscript (`CTRL` + `^`):  $x^y$

`ALT`+7 — text cell (with default stylesheet) (Format ► Style ► ...)

`ALT`+4 — section-heading cell (with default stylesheet)

## Exams

## References

Paragraphs marked by \* should be interpreted this way:

\*\*\*Final Exam Requirements Financial & Insurance Mathematics

# 20221-10-05 Lesson 1

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## FAQ

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## Reminders

### Prices and returns (definitions)

$P_0, P_1, \dots$  (prices of an asset typically stocks, shares, cena aktiva) in times 0, 1, ... are **nonnegative** random variables (limited liability, princip omezeného ručení)

$p_t = \ln P_t$  ... **logarithmic price**, arbitrary sign

$R_t = (P_{t+1} - P_t)/P_t = P_{t+1}/P_t - 1$  ... rate of return (ROR, míra výnosnosti, míra zisku), return (výnos), arbitrary sign

$r_t^* = p_{t+1} - p_t$  ... difference of the logarithmic prices

$1 + R_t = P_{t+1}/P_t$  ... These random variables are nonnegative

$R^{(T)} = \prod_{t=0}^{T-1} (1 + R_t) - 1 = P_{T-1}/P_0$  ... return in period  $[0, T]$

$(1 + R^{(T)})^{1/T} - 1$  ... **annualized return** in period  $[0, T]$  (geometric mean minus 1)

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## Theory of Portfolio 1

The whole chapter on Portfolio Theory available at

[http://www2.karlin.mff.cuni.cz/~hurt/20221002\\_Theory\\_Of\\_Portfolio.pdf](http://www2.karlin.mff.cuni.cz/~hurt/20221002_Theory_Of_Portfolio.pdf)

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### Konec 2022-10-05

2022-10-12 Lesson 2

2022-10-19 Lesson 3

2022-10-26 Lesson 4

2022-11-02 Lesson 5

2022-11-09 Lesson 6 **The Dean's day**

2022-11-16 Lesson 7

2022-11-23 Lesson 8

2022-11-30 Lesson 9

2022-12-07 Lesson 10

2022-12-14 Lesson 11

2022-12-21 Lesson 12

2022-01-04 Lesson 13

\*\*\*Misc