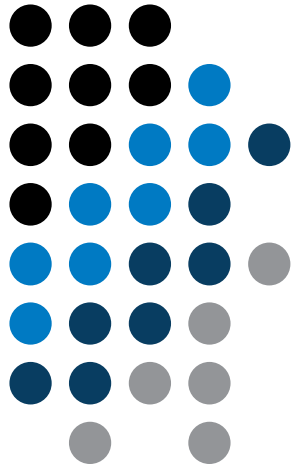
A0B17MTB – Matlab

# Course Information


Miloslav Čapek
miloslav.capek@fel.cvut.cz
Viktor Adler, Pavel Valtr

Department of Electromagnetic Field
B2-634, Prague



# A0B17MTB

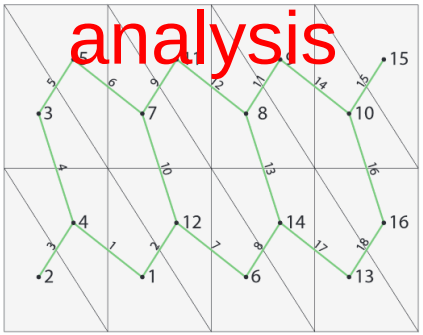
- 13 weeks (14th week is a 'reserve')
  - 11 blocks with new theory, 1 block of bonuses, 1 block of examples
- conditions of credit award:
  - to hand in a project (next-to-last week of the semester, 60 points)
    - **competition assignment** (see next slide)
  - to pass a test, 20 points (min. 50%, next-to-last week)
    - on top of that two short tests during semester, 20 points (min. 10 points are needed)
    - 3 bonus examples during the semester, 6 bonus points
  - max. 2 missed classes (more absences only after prior arrangement)
    - any lecture can be substituted
- could happen that not all of the stuff of the course will be presented, because of time constraint – understanding the basics is a priority
  - bonus stuff (slides) available for advanced students
- https://cw.fel.cvut.cz/wiki/courses/a0b17mtb/start

| | | | |
|---|---|---|---|
| Data types | Code execution | Visualization | Relation and logical operators |
| Matrix operations | User scripts and functions | Numerical methods | Symbolic math |

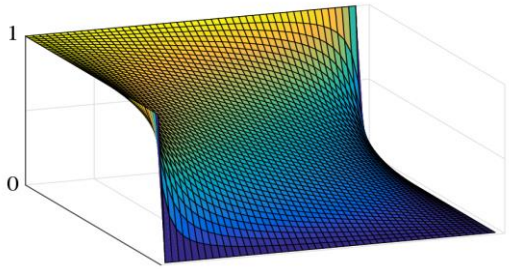
# Competition assignment

- selected assignments from previous semesters:

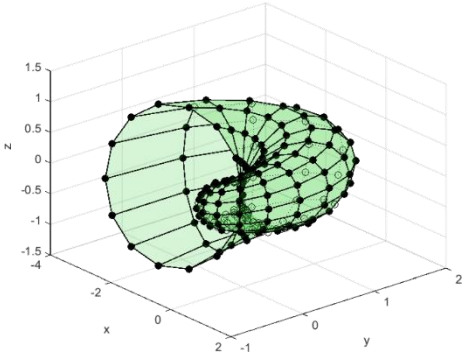
Graph analysis




Jacobi method




Effective plotting




- see https://cw.fel.cvut.cz/wiki/courses/a0b17mtb/projects/soutez
- project can be selected by any number of students
- conditions:
  - project is completed according the assignment → credit award
  - project is the best one → winning the competition
    - prizes for the first three winners

# A0B17MTB – Course syllabus

| | |
|---|---|
| 1 | Introduction, information on the course, MATLAB workspace, basic arithmetic operators, basic functions |
| 2 | Complex numbers, complex matrix design, matrix operations, element-by-element operations, introduction to vectorization, matrix dimension |
| 3 | Indexing, data type and size, output format |
| 4 | MATLAB Editor, script design, relation and logical operators, cells |
| 5 | Cycles, cycles vs. vectorization, control flow, program branching |
| 6 | Visualization in MATLAB #1, debugging |
| 7 | Functions (main functions, subfunctions, nested functions, anonymous functions) |
| 8 | Struct, strings, ‘eval’ and ‘feval’ functions, MATLAB path |
| 9 | Visualization in MATLAB #2, GUI #1 |
| 10 | GUI #2 |
| 11 | Set operations, sorting, searching, user-defined functions #1 |
| 12 | Date and time functions, error handling, I/O, basics of symbolic computations |
| 13 | Exercises , test |
| 14 | (Reserve) |

# A0B17MTB – Deadlines

| | |
|---|---|
| 1 | call for project proposals |
| 2 | |
| 3 | *bonus example (1-3 points)*, list of projects, discussion on own topics |
| 4 | |
| 5 | *short test (approx. 10-15 min) aimed on solving given problem in Matlab, 10 points* |
| 6 | project choice |
| 7 | *bonus example (1-3 points)* |
| 8 | |
| 9 | *short test (approx. 10-15 min) aimed on solving given problem in Matlab, 10 points* |
| 10 | *bonus example (1-3 points)* |
| 11 | |
| 12 | |
| 13 | *test (20 points), project hand-in (next-to-last week of the semester, 60 points), credit award* |
| 14 | reserve, competition assignment measurement |

# Credit award

| | Points | Min. points |
|---|---|---|
| Bonus example #1 | 2 | 10 |
| Short test #1 | 10 | |
| Bonus example #2 | 2 | |
| Short test #2 | 10 | |
| Bonus example #3 | 2 | |
| Test | 20 | 10 |
| Project | 60 | 30 |

| Grade | Points |
|---|---|
| A | 90–100 |
| B | 80–89 |
| C | 70–79 |
| D | 60–69 |
| E | 50–59 |
| F | 0–49 |

# A0B17MTB – Schedule

- harmonogram of SS 2017/2018 (also on the web page):

| | 1. týden | | 2. týden | | 3. týden | | 4. týden | | 5. týden | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 19.2. | 21.2. | 26.2. | 28.2. | 5.3. | 7.3. | 12.3. | 14.3. | 19.3. | 21.3. |
| | PO 16:15 | ST 16:15 | PO 16:15 | ST 16:15 | PO 16:15 | ST 16:15 | PO 16:15 | ST 16:15 | PO 16:15 | ST 16:15 |
| **poznámka** | | | | | | | | | | |
| **master** | Viktor | Viktor | Viktor | Viktor | Viktor | Viktor | Michal | Michal | Michal | Michal |
| **slave** | Michal | Michal | Michal | Michal | Michal | Michal | Vít | Vít | Vít | Vít |
| **náplň** | 1 (úvod) | 1 (úvod) | 2 (matice) | 2 (matice) | 3 (indexace) | 3 (indexace) | 4 (editor, relac. op.) | 4 (editor, relac. op.) | 5 (cykly, vetveni) | 5 (cykly, vetveni) |
| **harmonogram** | | | | | bonusový příklad | bonusový příklad | | | 1. písemka | 1. písemka |

| | 6. týden | | 7. týden | | 8. týden | | 9. týden | | 10. týden | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 26.3. | 28.3. | 2.4. | 4.4. | 9.4. | 11.4. | 16.4. | 18.4. | 23.4. | 25.4. |
| | PO 16:15 | ST 16:15 | PO 16:15 | ST 16:15 | PO 16:15 | ST 16:15 | PO 16:15 | ST 16:15 | PO 16:15 | ST 16:15 |
| **poznámka** | | | Velikonoční pondělí | | *Míla, Michal - EuCAP* | *Míla, Michal - EuCAP* | *Michal - Londýn* | *Michal - Londýn* | | |
| **master** | Michal | Michal | | Viktor | Viktor | Vít | Vít | Vít | Vít | Vít |
| **slave** | Viktor | Vít | | Míla | Vít | Viktor | Míla | Míla | Míla | Míla |
| **náplň** | 6 (vizual. 1) | 6 (vizual. 1) | | 7 (funkce) | 7 (funkce) | 8 (textové řetězce) | 8 (textové řetězce) | 9 (gui1) | 9 (gui1) | 10 (gui2) |
| **harmonogram** | zadání projektů | zadání projektů | | bonusový příklad | bonusový příklad | | | 2. písemka | 2. písemka | bonusový příklad |

| | 11. týden | | 12. týden | | 13. týden | | 14. týden | | | | | | soutěž | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 30.4. | 2.5. | 7.5. | 9.5. | 14.5. | 16.5. | 21.5. | 23.5. | | | | | | |
| | PO 16:15 | ST 16:15 | PO 16:15 | ST 16:15 | PO 16:15 | ST 16:15 | PO 16:15 | ST 16:15 | | | | | | |
| **poznámka** | *Viktor - Šumava* | | | | *Michal - Polsko* | Rektorský den | | | | | | | bude doplněno (viz web) | |
| **master** | Vít | Míla | Míla | Míla | Míla | | všichni | vsichni | | | | | | |
| **slave** | Míla | Viktor | Viktor | Viktor | Vít | | | | | | | | | |
| **náplň** | 10 (gui2) | 11 (mnoz. operatory) | 11 (mnoz. operatory) | 12 (bonusy) | 12 (bonusy) | | 13 (test, proj.) | 13 (test, proj.) | | | | | | |
| **harmonogram** | bonusový příklad | | | | | | test, zápočet | test, zápočet | | | | | soutěž | |

Náplň předmětu:

| | | | |
|---|---|---|---|
| 1 (úvod) | 5 (cykly, vetveni) | 9 (gui1) | 13 (test, proj.) |
| 2 (matice) | 6 (vizual. 1) | 10 (gui2) | 14 (rezerva) |
| 3 (indexace) | 7 (funkce) | 11 (mnoz. operatory) | |
| 4 (editor, relac. op.) | 8 (textové řetězce) | 12 (bonusy) | |

| | | | | | |
|---|---|---|---|---|---|
| zadání projektů | 1. písemka | 2. písemka | test | zápočet | **soutěž** | bonusový příklad |

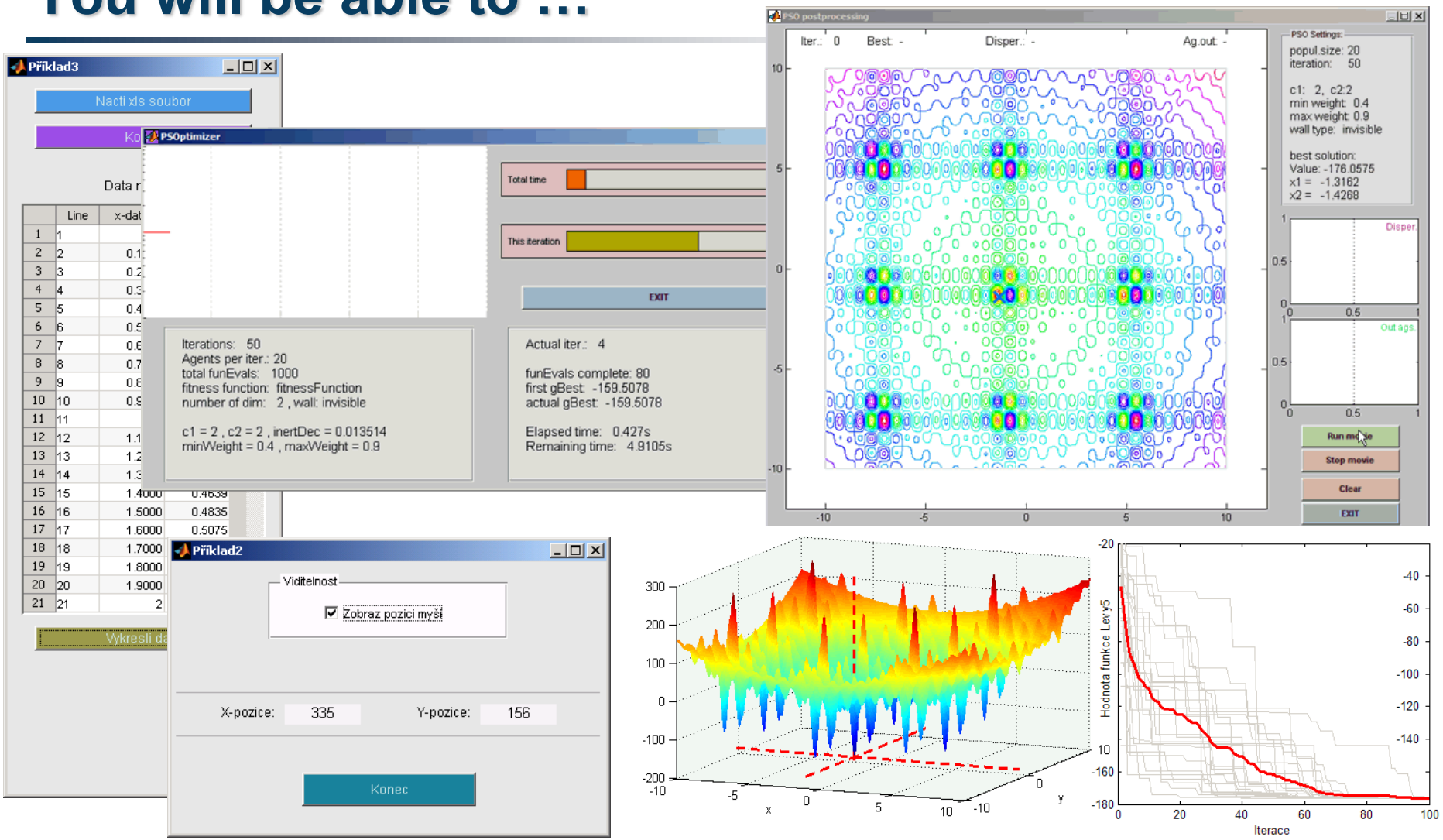
Pozn.: bonusový příklad je za 1-3b a vybrán ze šedých příkladů (případně zcela mimo slajdy).
Pozn.: věcná část harmonogramu může být postupně mírně zpozděna

- this is how the bonus slides look like (see the background color...)

# A0B17MTB – Principles

- the aim of the course is to teach you something – if the presentation is to fast, be heard
- if you have an idea / proposal how to solve a problem in a more efficient way, put it forward
- can happen that the lecturer is not able to answer your question immediately, in that case the answer will be provided during the next lecture

# You will be able to …




- see the previous students' projects

# Recommended literature, resources

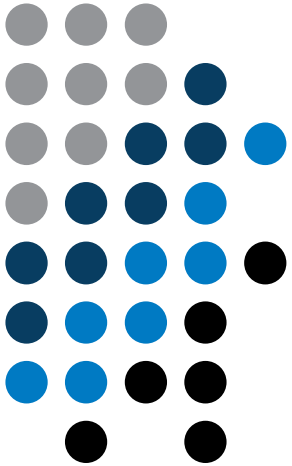
- Matlab documentation

```
>> doc % opens the help browser
```

- Basic web-based textbooks on Matlab (so called primers)
  - www.mathworks.com/help/pdf_doc/matlab/getstart.pdf
  - http://artax.karlin.mff.cuni.cz/~beda/cz/matlab/primercz/matlab-primer.html
- Attaway, S.: Matlab – A Practical Introduction to Programming and Problem Solving, 3rd ed.
  - available at Department's library
- Hahn, B. H., Valentine, D. T.: Essential Matlab, 5th Ed.
  - available at Department's library
- other literature and sources will be mentioned during the semester...

# Thank you!



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Miloslav Čapek
miloslav.capek@fel.cvut.cz

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