

Assignment 7

Mathematical Tools for ITS (11MAI)

Mathematical tools, 2021

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Assignment 7

The final assignment relates to the actual problematic situation of COVID-19 pandemic. We will study national data published by the Czech ÚZIS institute and try to predict the future hospital and ICU bed requirements from the historical data.

- a) Check the national dataset repository at <https://onemocneni-aktualne.mzcr.cz/api/v2/covid-19>.
- b) Download the hospitalization dataset (“COVID-19: Přehled hospitalizací”) from <https://onemocneni-aktualne.mzcr.cz/api/v2/covid-19/hospitalizace.csv>.
Alternatively you may use the recent V3 API.
- c) Separate the dataset into the second (autumn 2020), third (winter and spring 2021) and fourth (current) outbreak periods.

- d) Use the data from the second and third outbreak wave to identify two regression models that predict (i) the number of new hospitalizations and (ii) new ICU admissions **one week from the current date**. You may try multiple linear regression or LSTM ANN or some other approach that you think is suitable.
- e) Use the models to predict the situation for the current, fourth outbreak.
- f) Compose a short report discussing the prediction quality, try to explain the differences.
- g) Deliver the code and your report as a ZIP file by January 7, 2022.
The standard rules for reports apply.