Week: March 15 – March 21, 2021
Topic: **Extrema**

The below provided instructions should guide you through studying the topic. For additional explanation, clarification and extra material contact the Lecture/Tutorial teacher by email or the MS-Teams platform for live online consultation (see webpage for the link).
https://mat.nipax.cz/mathematics:mathematics_ii

This week we will fully focus on studying the extrema of functions of multiple variables. We will first take a look at investigation of critical points and local extrema. We will build on the knowledge from first semester and extend it to multiple dimensions. In the second part of the week we will also revisit the absolute extrema. Again, we will explain the conditions that will guarantee the existence of global extrema. Then we will formulate an algorithm for finding the global extrema. As a special task, we will investigate the constrained extrema. For that purpose we will mainly use the substitution method, but we will also briefly take a look at the Lagrange multipliers approach. It is not sure whether we will pass through all these topics this week, maybe a part of it will be left for next week. In any case the end of the differential calculus is approaching and thus also the delivery of first part of your long term homework is coming soon.

1) Read and learn the explanation from the textbook. Scanned pages can be found on the web page.
https://mat.nipax.cz/_media/mathematics:pages_24-33.pdf

Additional material and alternative explanation with many figures and exercises can be found in (free) online available textbooks
http://www.math.wisc.edu/~keisler/calc.html
namely chapter 11 http://www.math.wisc.edu/~keisler/chapter_11.pdf

https://openstax.org/details/books/calculus-volume-3
namely chapter 4 https://openstax.org/books/calculus-volume-3/pages/4-introduction
https://openstax.org/books/calculus-volume-3/pages/4-7-maxima-minima-problems
https://openstax.org/books/calculus-volume-3/pages/4-8-lagrange-multipliers

2) Take a look at the solved exercises from our collection of examples
questions: https://mat.nipax.cz/_media/extrems.pdf
complete solutions (in Czech): https://mat.nipax.cz/_media/extremy_funkci.pdf

3) As a training solve (at least) the following exercises.
212, 216, 222, 224 – local extrema
229, 230, 232, 233 – global extrema

4) As a long term homework, to be delivered at specified deadline, solve all the corresponding exercises from sample exams from our webpage
https://mat.nipax.cz/_media/mathematics:ma2_exam_1n_en.pdf
https://mat.nipax.cz/_media/mathematics:ma2_exam_2n_en.pdf
https://mat.nipax.cz/_media/mathematics:ma2_exam_3n_en.pdf

The delivery of all sample exams, completely and correctly solved (by yourself) is necessary (but not sufficient) condition for obtaining the assessment from tutorials.