

Week: April 13 – April 19, 2020

Topic: **Applications of line integral & Potential fields in E_2**

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

The goal for this week is to finish the topic of line integral. Besides of various standard applications of line integrals (of both kinds) we will focus on some specific vector fields in E_2 . The line integral path independence for certain class of vector fields will be introduced together with the notion of potential (conservative) fields. The potentiality of vector fields will be studied namely in two dimensions, where the sufficient conditions can easily be formulated making use of, among others, the Green's theorem that we discussed last week. The case of three-dimensional potential vector fields will be left for the end of semester, when the surface integral will be explained.

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_70-83.pdf

https://mat.nipax.cz/media/mathematics:pages_104-118.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 13 http://www.math.wisc.edu/~keisler/chapter_13.pdf

<https://openstax.org/books/calculus-volume-3/pages/1-introduction>

namely chapter 6 <https://openstax.org/books/calculus-volume-3/pages/6-introduction>

2) Take a look at the solved exercises from our collection of examples

questions: https://mat.nipax.cz/media/line_integral_1.pdf

complete solutions (in Czech): https://mat.nipax.cz/media/krivkovy_integral_komplet.pdf

3) As a training solve (at least) the following exercises.

492, 494, 515 – applications of line integral

544, 565, 582 – Green's theorem and potential fields

4) As a long term homework, to be delivered at your return to the school (at latest at the end of semester, prior getting the assessment from tutorials), solve all the line integral (including applications and potential fields examples) exercises from sample exams from our webpage.

https://mat.nipax.cz/media/mathematics:ma2_exam_1_en.pdf

https://mat.nipax.cz/media/mathematics:ma2_exam_2_en.pdf

https://mat.nipax.cz/media/mathematics:ma2_exam_3_en.pdf

If you have some part of the homework done, ready to be checked and corrected by us, please scan it to PDF and send it to us by email.

Don't wait and leave it at the end of semester!