Middlebury
College

Exam II Review

Textbook Reference:
- *Vector Calculus*, Colley, 4th Edition: §2.1-2.6, 3.3

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Topics to know:

- limits of functions of several variables

- graphs of functions of two variables

- level curves/level surfaces

- level curve diagrams

- linearisations and applications; the tangent plane to the graph of $f(x, y)$

- partial derivatives and their geometric intepretation

- differentiability of scalar-valued functions

- gradient; derivatives; Jacobian matrices

- Chain Rule

- directional derivative and its geometric interpretation

- tangent lines/planes to level curves/surfaces

- conservatives vector fields, potential functions

Computations to know:

- How to compute (non-)existence of limits using Cartesian/polar coordinates

- How to intepret a level curve diagram

- How to compute the linearisation and use it to approximate a given function

- How to compute partial derivatives and interpret the value

- How to compute the Jacobian matrix

- How to use the Chain Rul

- How to comptue the directional derivative

- How to use a level curve diagram to compute directional derivatives

- How to compute tangent lines/planes to level curves/surfaces.

- How to check if a vector field is conservative

- How to compute a potential function for a conservative vector field.