

Lecture 16

Functions of several variables

Vitalii Konarovskiy

Leipzig University

Mathematics 2 – Calculus of Functions of Several Variables
SS 2019

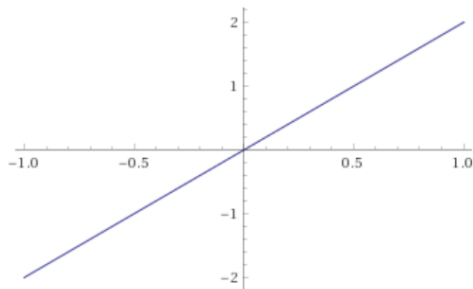
vitalii.konarovskiy@math.uni-leipzig.de



UNIVERSITÄT LEIPZIG

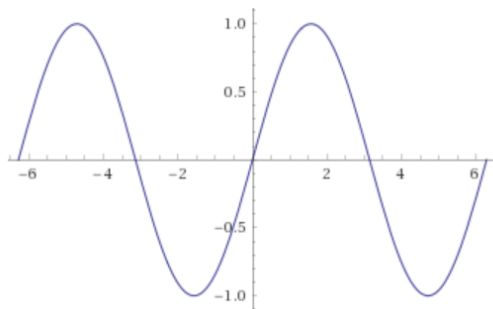
Examples of function of several variables

$$f(x) = 2x, \quad x \in \mathbb{R}$$



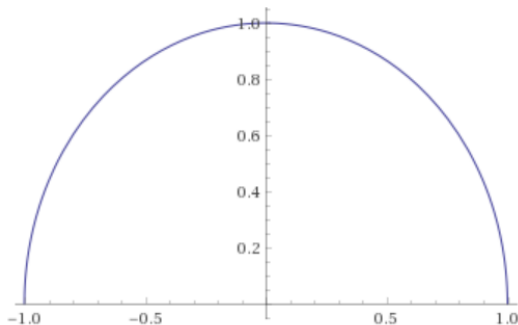
Examples of function of several variables

$$f(x) = \sin x, \quad x \in \mathbb{R}$$



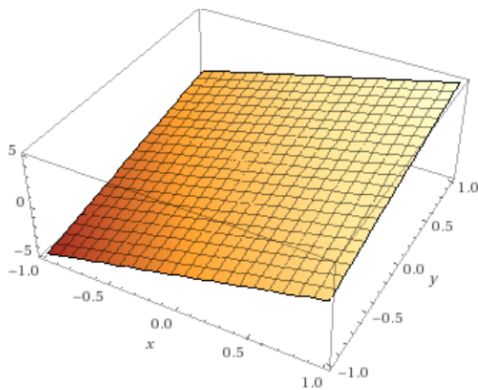
Examples of function of several variables

$$f(x) = \sqrt{1 - x^2}, \quad x \in [-1, 1]$$



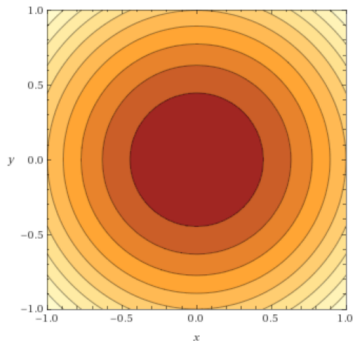
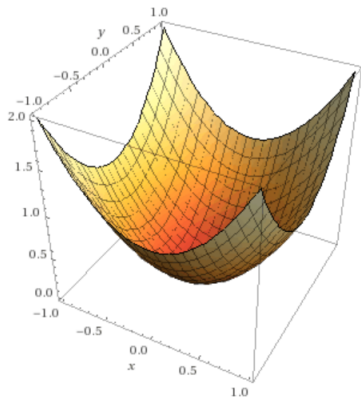
Examples of function of several variables

$$f(x, y) = 3x + 2y, \quad (x, y) \in \mathbb{R}^2$$



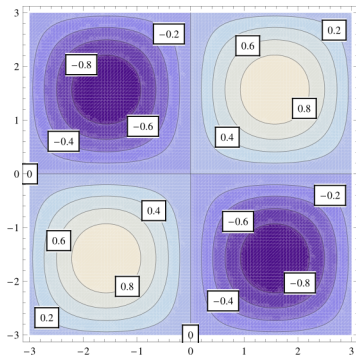
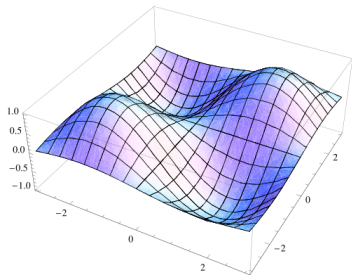
Examples of function of several variables

$$f(x, y) = x^2 + y^2, \quad (x, y) \in \mathbb{R}^2$$



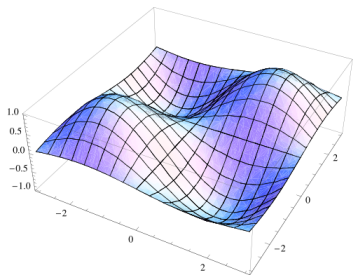
Examples of function of several variables

$$f(x, y) = \sin x \sin y, \quad (x, y) \in \mathbb{R}^2$$

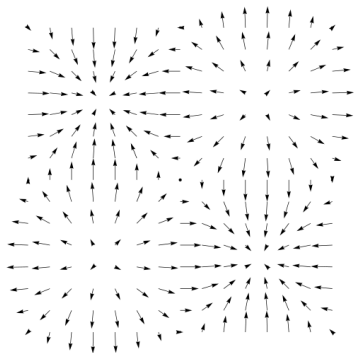


Examples of function of several variables

$$f(x, y) = (\cos x \sin y, \sin x \cos y) = \nabla \sin x \sin y, \quad (x, y) \in \mathbb{R}^2$$



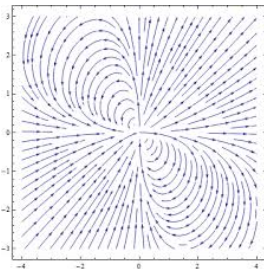
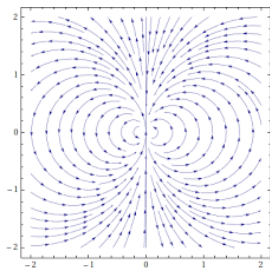
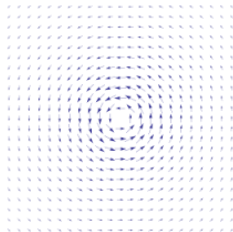
$$g(x, y) = \sin x \sin y$$



$$f(x, y)$$

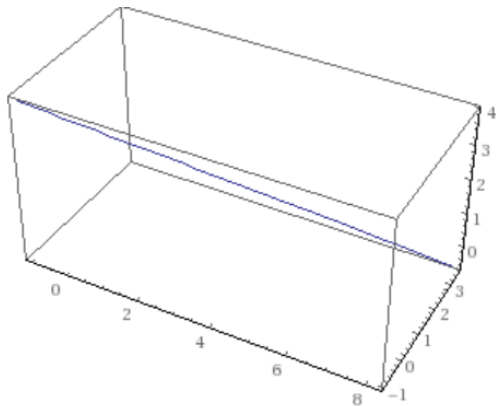
Examples of function of several variables

Other examples of vector-valued functions



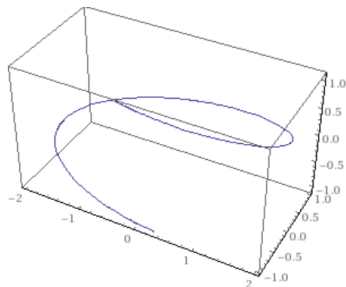
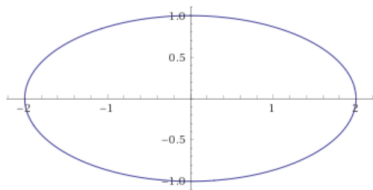
Examples of function of several variables

$$f(t) = (1 - 2t, -t, 3 + t), \quad t \in \mathbb{R}$$

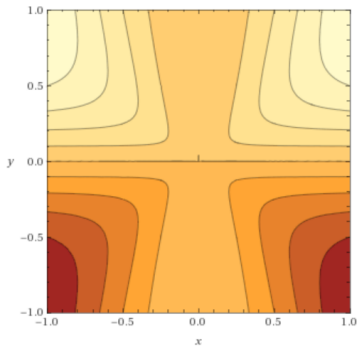
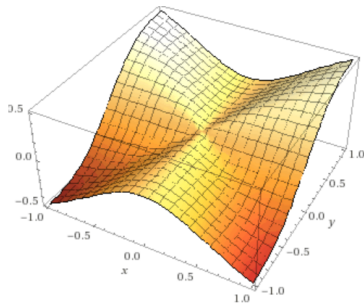


Examples of function of several variables

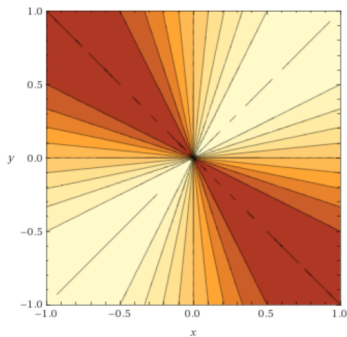
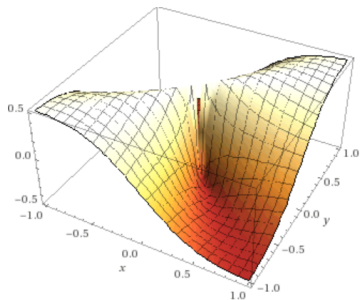
$$f(t) = (\sin t, \cos t), \quad t \in [0, 2\pi) \quad f(t) = (\sin t, \cos t, \frac{t}{3}), \quad t \in [0, 2\pi)$$



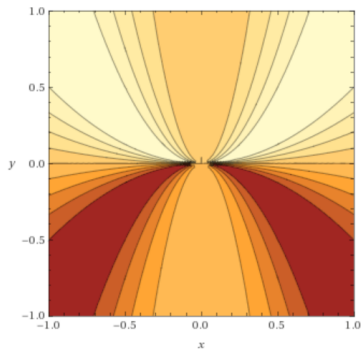
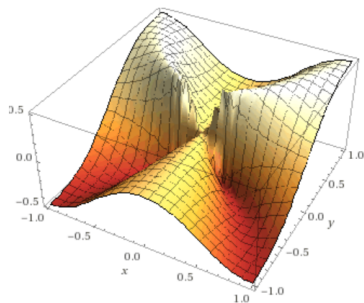
$$f(x, y) = \frac{x^2 y}{x^2 + y^2}$$



$$f(x, y) = \frac{xy}{x^2 + y^2}$$



$$f(x, y) = \frac{x^2 y}{x^4 + y^2}$$



$$f(x, y) = (x^2 + y^2) \ln(x^2 + y^2)$$

