math modeling lecture notes

erentar

2023-02-17 - present

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Chapter 0

Intro

Exam is 3 hours, 5 questions, no calculator, formula sheet is provided. Questions are all practice, no theory or proofs.

Chapter 1

Multivariable functions

Single-variable real function maps one real to another real[1]. (`f:x->y`)
This function defines a curve in 2D space.

The distinction between constant and a parameter is not very well defined. It doesnt matter much either.

- Constant: a value which never changes
- Parameter: a value which does change but is fixed within a function
- Variable: the function's main dependance.

Two-variable real function maps two reals to one real (`f:x,y->z`)
This function defines a surface in 3D space.

Domain of a function is the set of input values which map to an output.
Image of a function is the set of all outputs.

Vector functions will be covered in chapter 5.

Implicit function = relation.
Explicit function = function.

The rest of the lecture goes over the examples in https://p.cygnus.cc.kuleuven.be/bbcswebdav/pid-34055761-dt-content-rid-329735280_3/orgs/C7964130-B-2223/Functions%20of%20several%20variables.pdf, reasons about why the given functions result in the given shapes.

[1] takes one real and returns one real

Chapter 2

Multivariable derivatives

partial derivatives