040663 KFK PM/SCM/TL: Paper Reading

Find and read scientific papers

Where to find (scientific/technical) literature

- **Library**
  - Books
  - Journals
- **Electronic resources**
  - E-Books
  - E-Journals
  - Databases
- **Internet**
  - Websites of scientific organizations (universities, societies) or conferences
  - Homepage of researchers
  - Google (Scholar), Wikipedia, …

What source of information should I use?

- **Book**
  - self-contained (contains usually introductory parts)
  - additional information (case studies, background information)
  - reflects the authors‘ opinion
- **Journal article**
  - usually highly concentrated information
  - structure follows certain rules
  - articles are usually reviewed by other researchers
- **Website**
  - easy to access
  - who is the author? who‘s opinion?

Usual goal of a scientific paper

- **Present a problem (potentially new)**
- **Present a solution method for it**
- **Validate it through experiments**

Structure of a scientific paper (1/2)

- **Abstract (mandatory)**
  - Short summary of the problem setting and the major findings/results (usually only a few sentences)
- **Introduction (mandatory)**
  - general problem setting
  - explanation the structure of the paper
  - literature review (connection to other research)
- **Problem description / Problem formulation**
  - detailed explanation of the the problem at hand
  - introducing mathematical model formulations
  - comparison with similar problems

Structure of a scientific paper (2/2)

- **Solution methods**
  - explaining the solution methods
  - comparision with similar methods
- **Experiments**
  - apply solution methods
  - compare performance with other methods
- **Conclusions (mandatory)**
  - summarizing the most relevant contributions
  - suggest future research directions
- **Bibliography (mandatory)**
  - list of references

Other types of a scientific papers

- **Surveys / Reviews**
  - establish a classification for a range of similar problems
  - give an overview of existing methods for these problems
  - compare these methods

- **Case study**
  - reports on a particular case
  - not as general as a usual scientif paper

Extract information from a scientific paper

A paper was written at a certain time …

Nowadays:

- There might be different approaches
- There might be better results
- The problem might be considered in a different way (because of technical or theoretical issues)

Reasons why you many need related literature:

- Consult sources cited in the paper
- Consult newer papers on the subject
- Consult other non-cited papers

Extract information from a scientific paper

Judging the quality of a paper:

- Are there comparisons with related problems / solution methods (from other authors)?
- How general is the problem / solution method?
- Is the paper self-contained? Is everything included (cited) necessary to „reproduce“ the results?
- Is it „understandable“?
- Do other authors cite this paper? (http://www.isiknowledge.com)

Extract information from a scientific paper

Is the paper important for me?

- Is the problem similar to my problem?
- Is the performance of the solution method sufficient?
- Can the solution method be adapted to my problem?
- Can I use parts of the solution method?
- …