

# Embedding Artificial Intelligence and Soft Computing in general purpose programming languages

The logo for SDART, featuring the letters 'S', 'D', and 'A' in a bold, serif font, followed by a stylized triangle symbol, and then the letters 'R', 'T', and 'A' in the same font. The background of the logo is a dark blue gradient with a faint, glowing globe and binary code patterns.

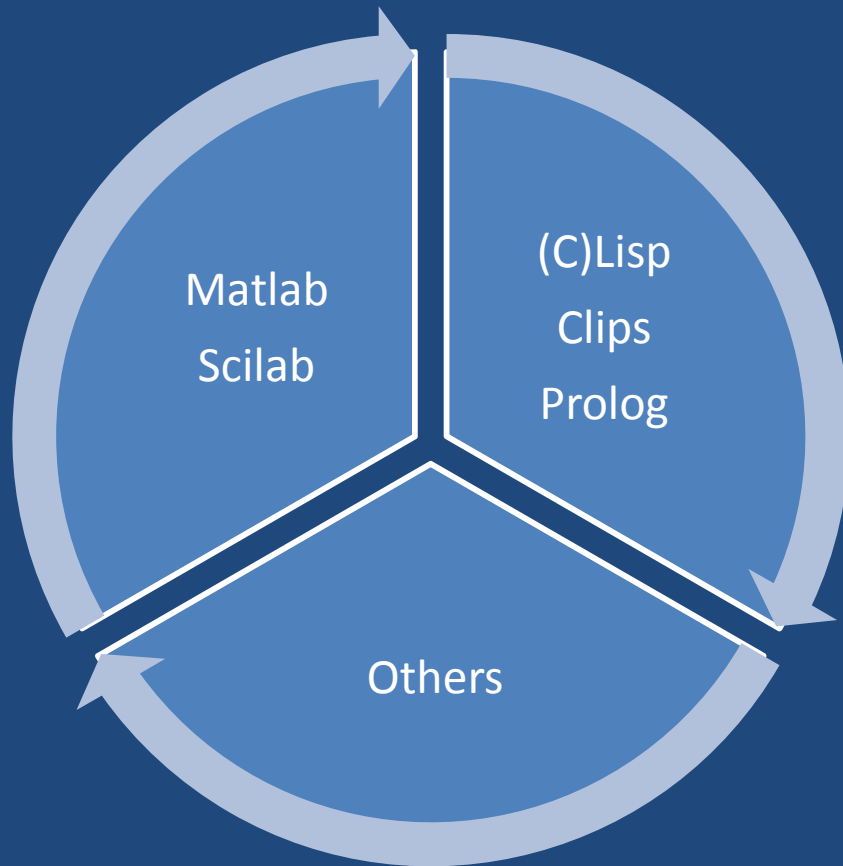
SDART

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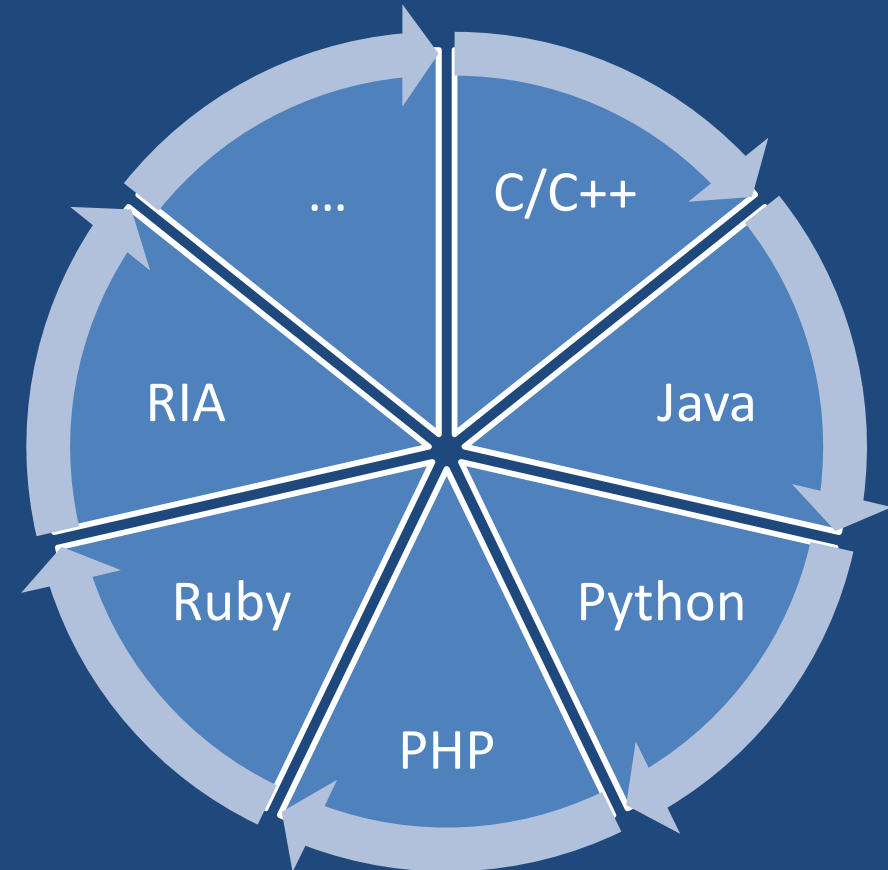
# Plan of presentation

- Problem
- Aim
- Intelligent software
- Examples

# Computer languages



Scientific perspective



Programming perspective

# Why

- Popular in the research community
- Specialized languages
- Many libraries/toolkits and examples are available

# Why not

- Specialized
- High price
- Simple or no GUI
- No networking
- Research not production languages
- CES (Numb3rs)

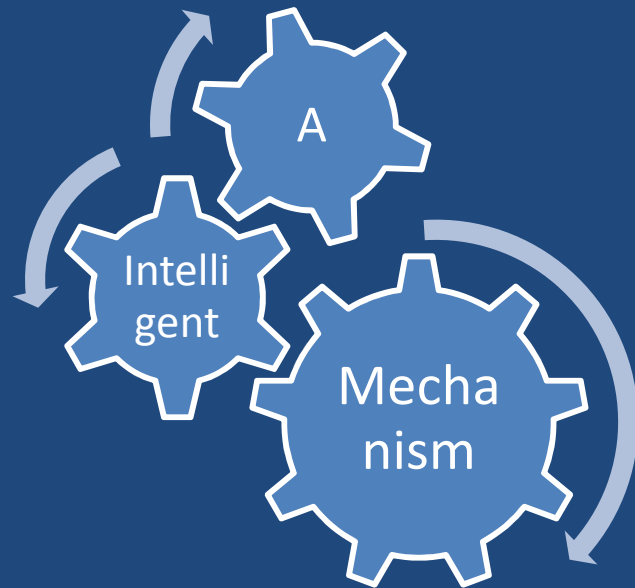
# The aim of this tutorial

- Promote other programming languages and technologies
- Show the benefits of software based on technologies

# Important features

- Scientific libraries
- Dynamic languages
- Prototyping
- Visual design (graphical programming)

# More important part of AI software



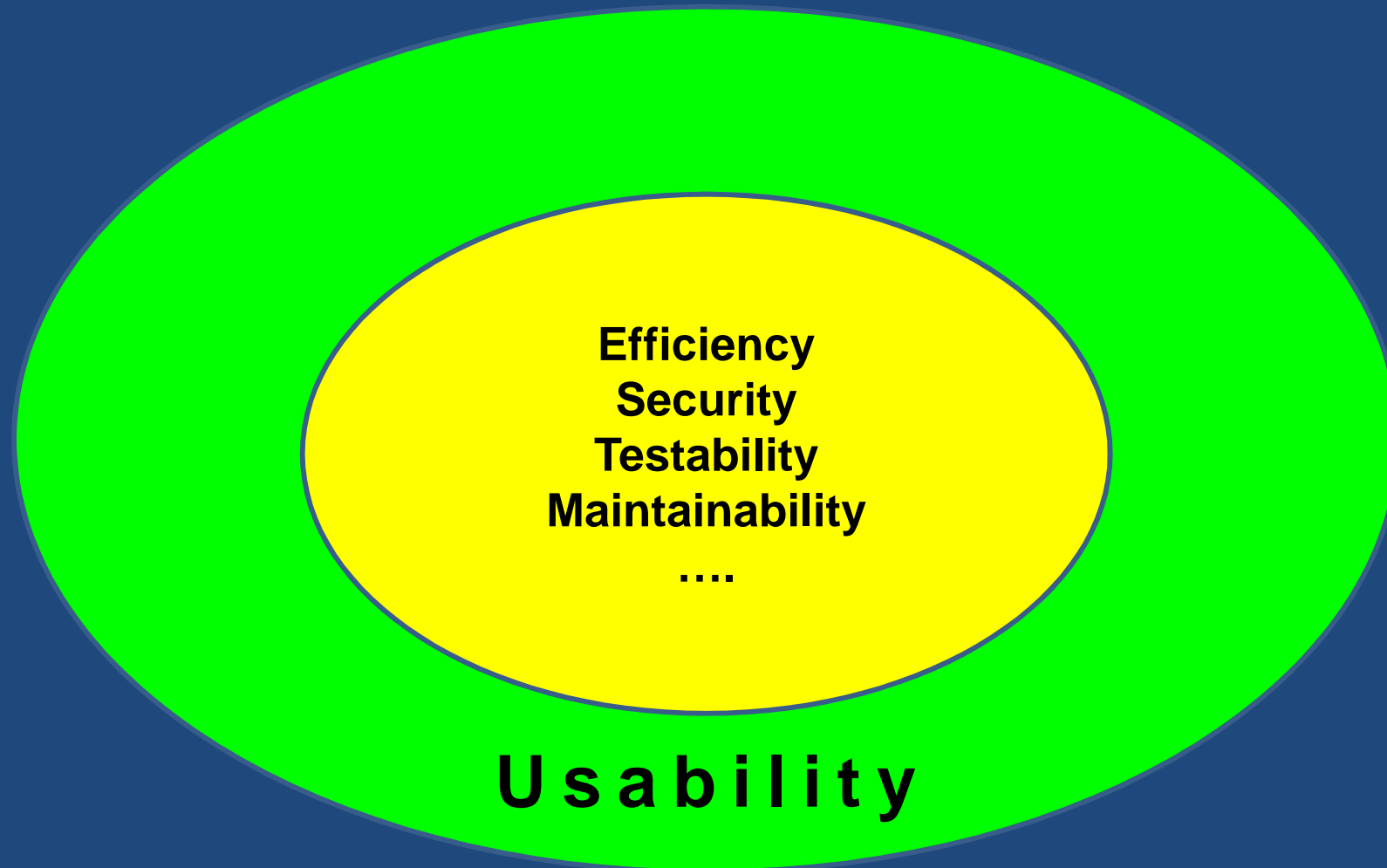
**Knowledge**  
Models  
Rules  
Graphs



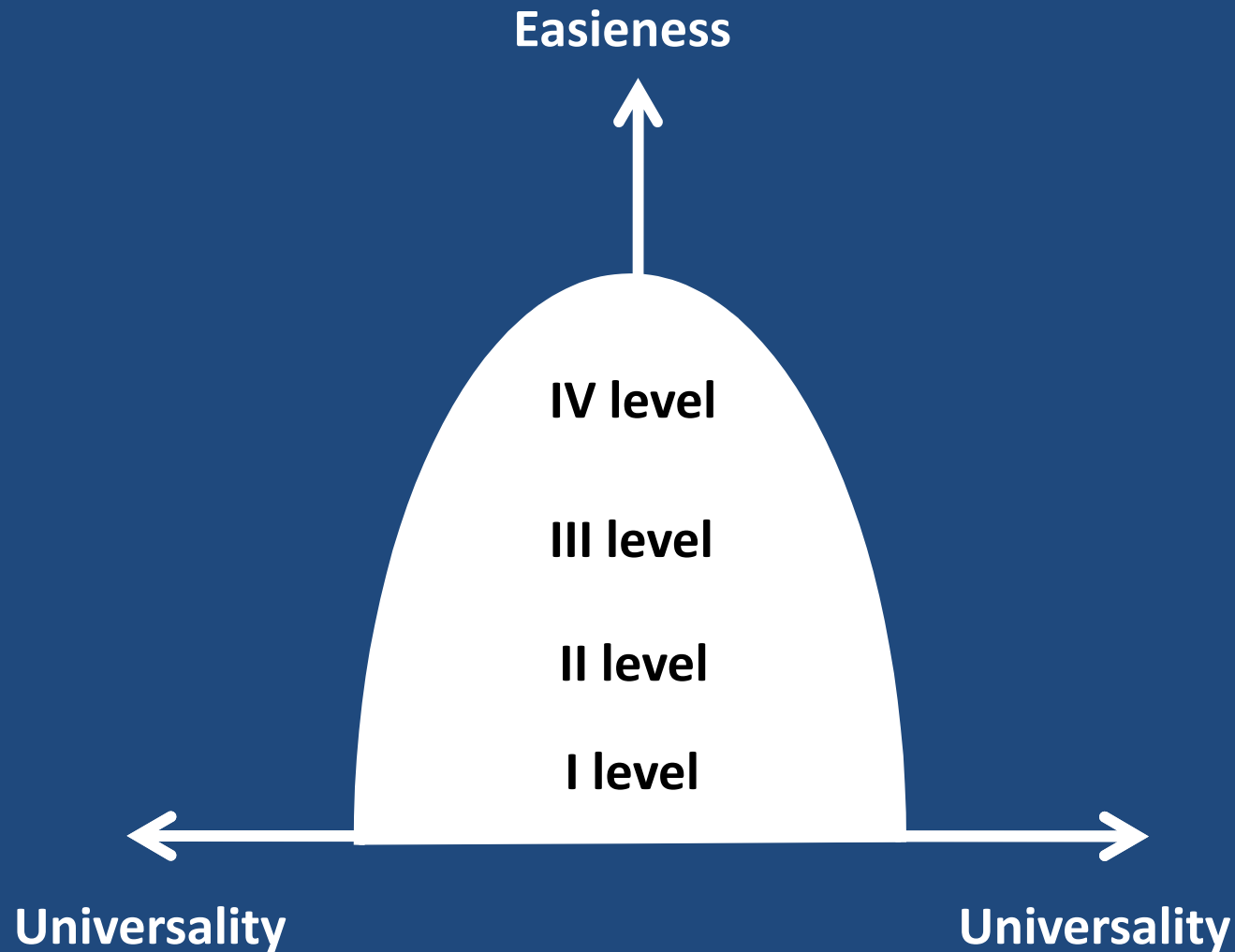
# Product



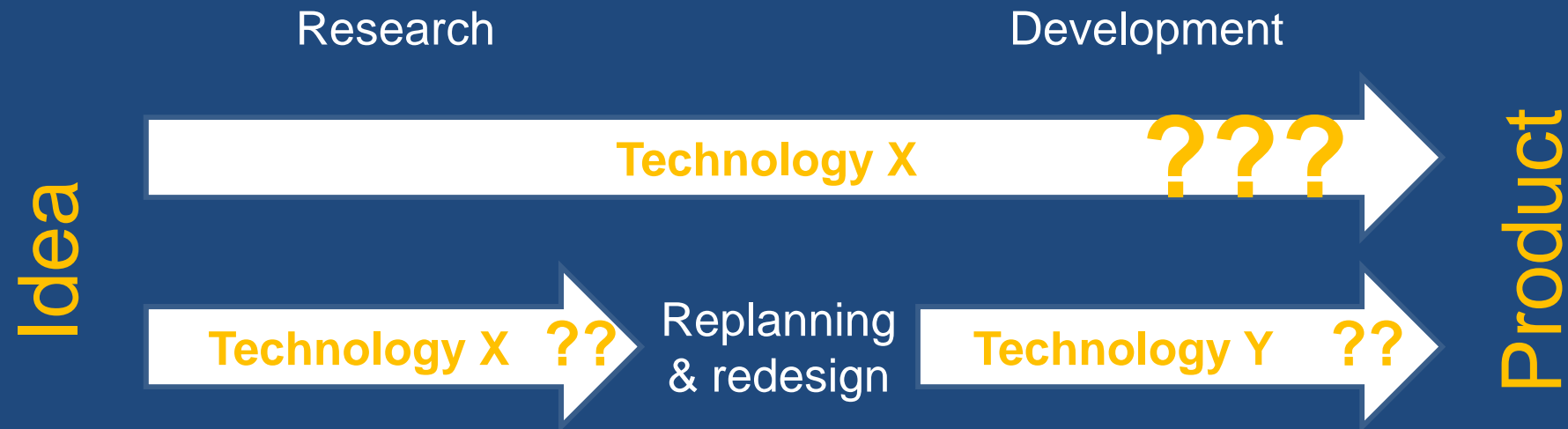
# Software quality factors



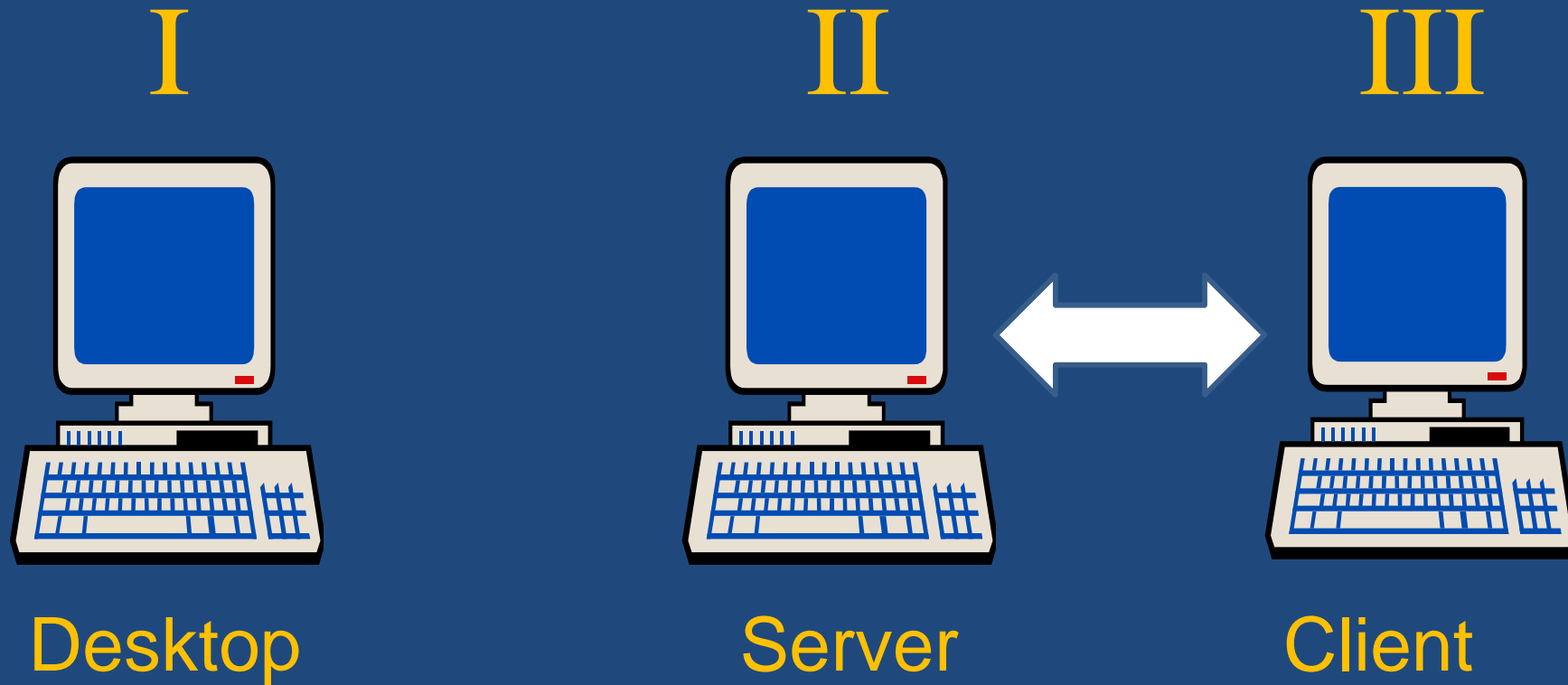
# Levels of programming languages



# Software production



# Examples



# Problem 1

Perform machine learning task:

- Iris
- kNN

Java + Java-ML

# Problem 1

Java:

- Highly popular
- Many libraries
- Portable
- GUI
- Networking
- Look&Feel

# Problem II

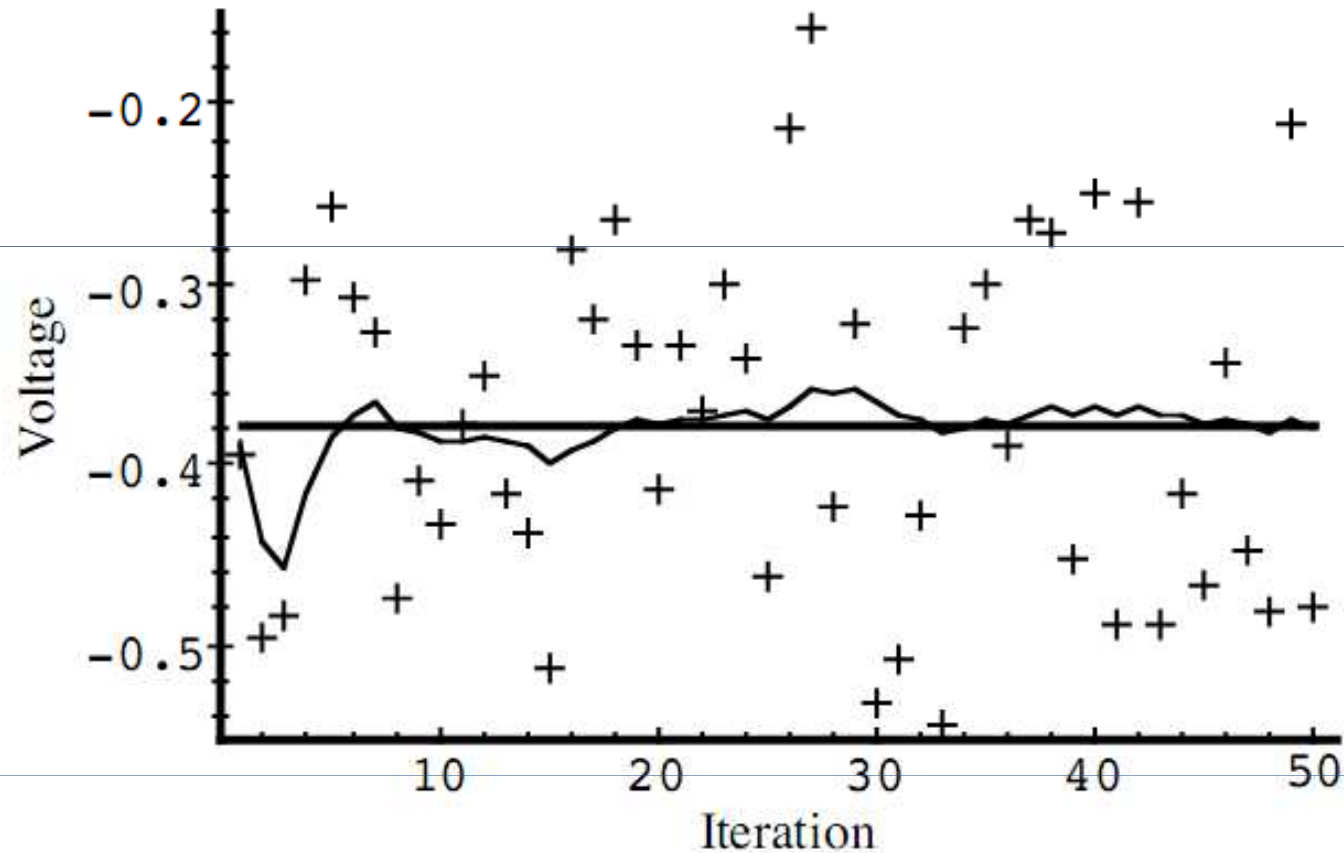
Web service with soft computing capabilities:

- Welch&Bishop filtering problem
- Graphical presentation of the results

Python + SciPy



# Problem II



**Figure 3-1.** The first simulation:  $R = (0.1)^2 = 0.01$ . The true value of the random constant  $x = -0.37727$  is given by the solid line, the noisy measurements by the cross marks, and the filter estimate by the remaining curve.

## Welch&Bishop

# Problem II

Python:

- Highly popular
- Prototyping
- GUI
- Networking
- Dynamic language
- Portable
- Multiple targets

# Problem III

Particle Swarm Optimisation:

- Animated
- On client machine

Flex (ActionScript)

# Problem III

Flex (but applies to the other RIAs):

- Web solutions
- Prototyping
- GUI
- Portable
- Easy to use

**Choose a language/technology that suits your problem.**

**Do not solve the problem in some way only because that suits your language/technology.**

# Idea

Prepare AI&SC programming benchmarks and compare:

- Speed
- Easiness
- Efficiency

**Tutorial will be available at  
[www.pietruszkiewicz.info](http://www.pietruszkiewicz.info)**