Introduction
The design and maintenance of modern systems requires multi-disciplinary knowledge on thousands of system components and their interactions. This is too complex for individual engineers to comprehend. Missed interactions often yield rework which causes budget and schedule overruns. Research shows that in engineering design up to 20% of project costs are related to rework. As such, engineers need methods and tools to better manage complexity. TNO ESI and Ratio Computer Aided Systems Engineering B.V. are committed to develop such methods and tools.

Assignment
The goal of this assignment is two-fold. The primary objective is to investigate to what extent the methods and tools developed by ESI and Ratio, respectively, are complementary and can enhance each other’s value within the engineering design process. In particular, one should focus on the questions:

- What are the similarities and differences in information content of the Daarius modelling framework (DF) [1] and the Elephant Specification Language (ESL) [2]?
- What are the strengths and weaknesses of DF and ESL, and how can a user benefit from the strengths of both? For example, is it possible to create model-to-model transformations between both frameworks?

The secondary objective is to investigate how the output of these modelling frameworks, being a dependency graph, can be automatically analysed to assist engineers in making design decisions. In particular, one should focus on answering the question:

- Is it possible to automatically identify quality-critical design trade-offs within the network of dependencies between components and design-parameters? If yes, how? If no, what should be added to support such functionality?

Findings with respect to both objectives have to be illustrated with an in-depth case study.

Size
45 ECTS

References

Start
September/October 2019

Finish
April/May 2020

Student Vacancy

Supervisors
Dr.ir. L.F.P. Etman (TU/e), Dr.ir. T. Bijlsma (TNO ESI), Ir. B. Huijbrecs (TNO ESI), Dr.ir. T. Wilschut (Ratio)