

PROCESS SIMULATION CUP 2015

PROCESS SIMULATION TRAINING FOR CHEMICAL ENGINEERING STUDENTS

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The oleochemical industry utilizes plant and animal derived fats to produce chemicals that are used for manufacturing of soaps, detergents, lubricants, solvents, biodiesel and bioplastics. The importance of oleochemical industry is constantly growing due to its ability to reduce the dependency on petrochemicals.

CHALLENGES IN ENGINEERING COURSES

- Lack of real-life industry data
- Reliance on textbook problems
- Need for innovative teaching methods
- Student's readiness to enter the industry
- Technology of commercial simulators

WHY TEACH WITH SIMULATIONS

- Theory meets practice
- Replication of complex real world aspects
- Hands-on teaching method
- Industry focused skills development
- Enhance student's technical knowledge

PSC AS A UNIQUE PROCESS SIMULATION TEACHING TOOL

PSC tasks emulate the modern demands and challenges relevant to engineering professionals. Students apply knowledge gained in the classroom in a real-work environment. PSC benefits:

TEACHERS

- Real industry data simulation training
- Practical student/class assessment tool
- Motivating and challenging teaching tool
- Active teaching method
- Increased learning outcome for students

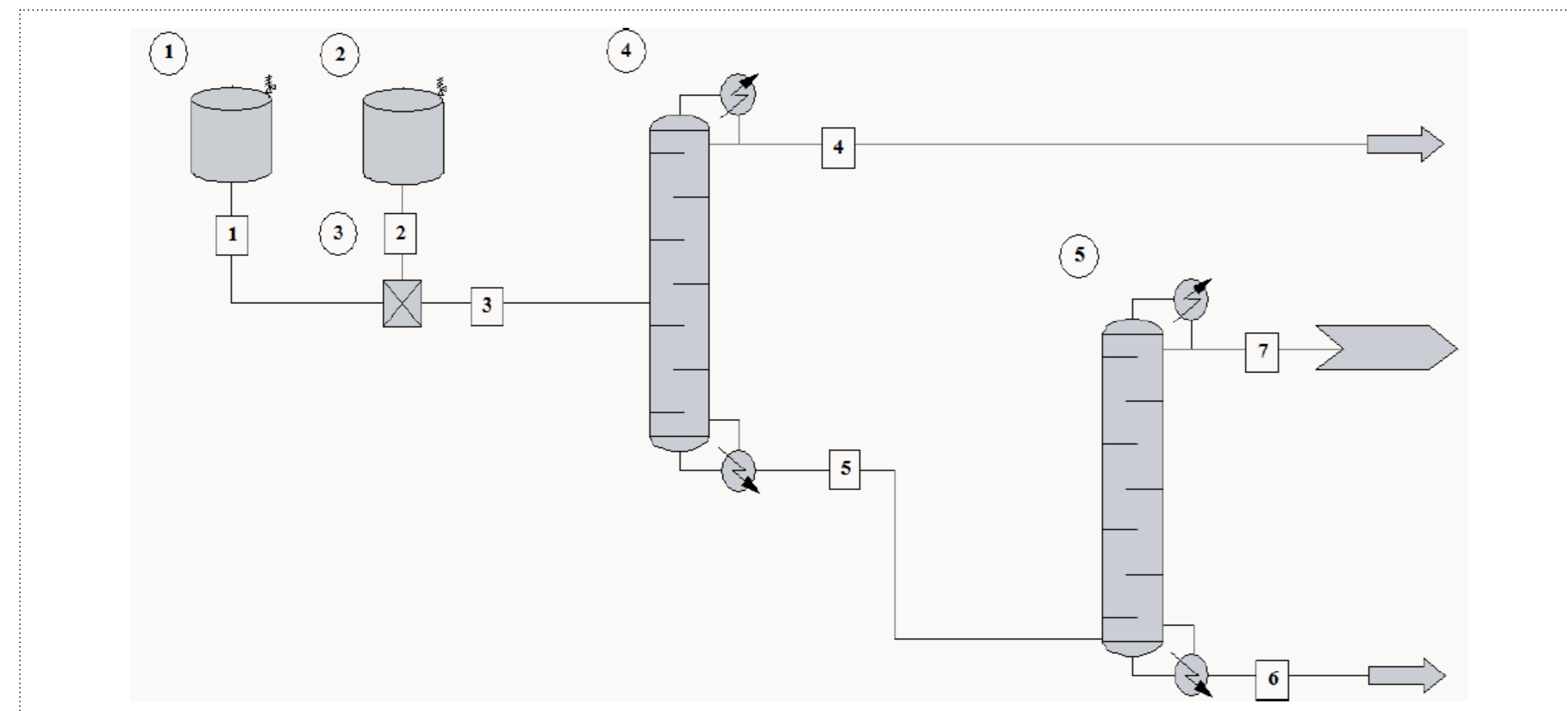
STUDENTS

- Critical and problem solving skills test
- Understanding of the essence of the simulated phenomenon
- Technical software knowledge
- Industry relevant skills acquisition

CHALLENGE BACKGROUND

Many plants are shifting towards flexible production to boost the plant economics. This involves short product life cycles as well as various renewable feedstocks. In order to successfully implement this, the usage of different production (stationary) and changeover (dynamic) scenarios is needed. Rigorous process models help to analyze and evaluate these scenarios within a short time.

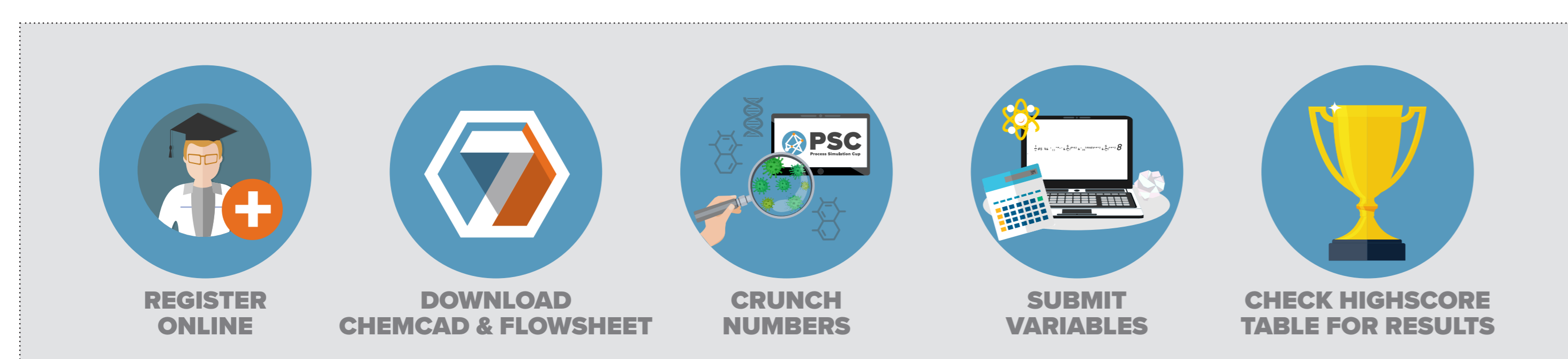
Flowsheet of a two-step distillation system for feed oil conditioning



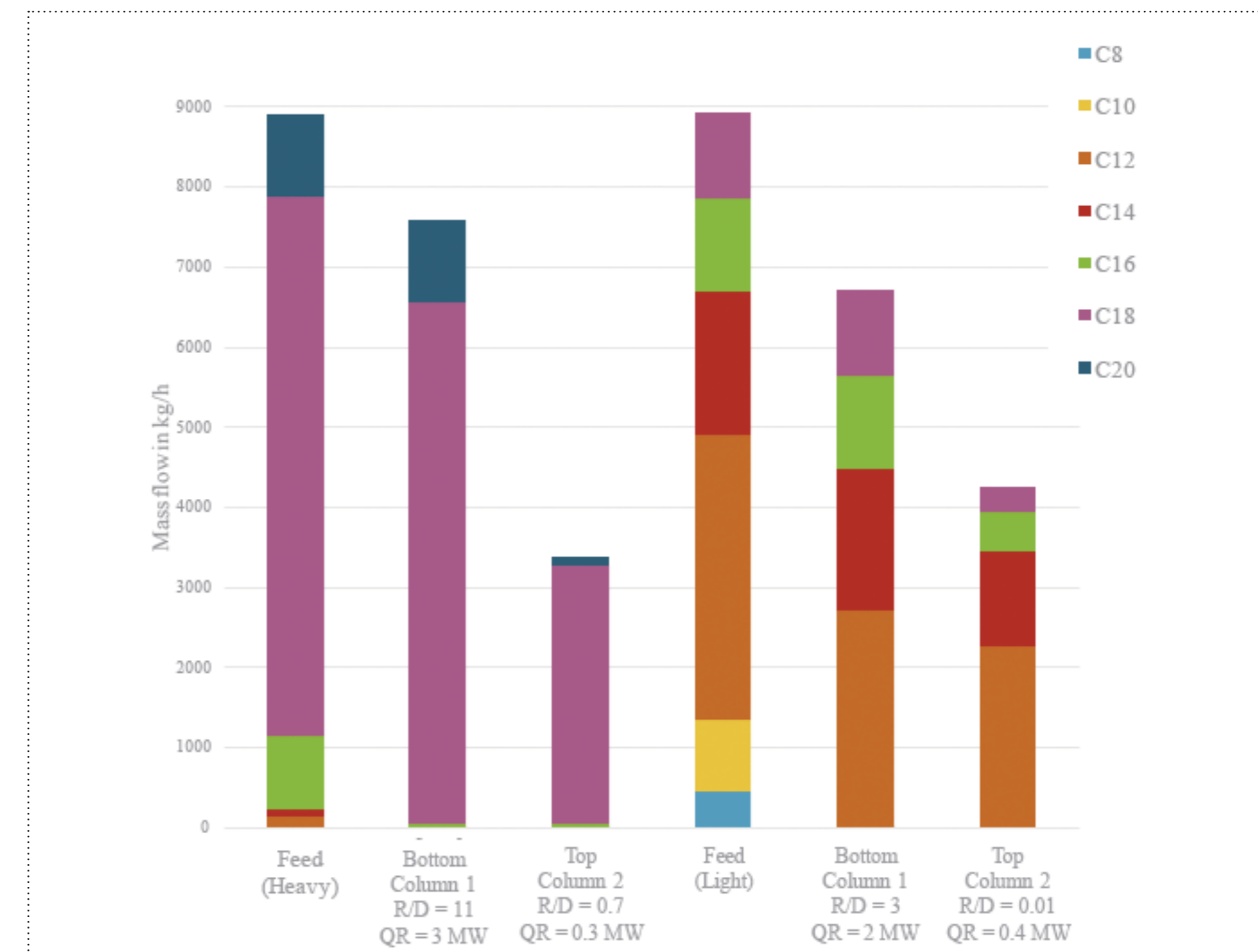
CASE STUDY – OLEOCHEMICAL INDUSTRY

The oleochemical industry is a major processor of natural products and recycled materials which results in fluctuating compositions of the source materials. In this case study, an upstream distillation facility used for the conditioning of a renewable feed is considered. The facility has two serial distillation columns to separate undesired low and high boilers. Here, two vegetable oil sources – one heavier and one lighter oil – are separated into their respective product compositions. In such a plant, it is favorable to reduce the changeover time. This increases the production time while the costs for resources and waste streams are reduced.

HOW TO JOIN PSC



Change of the stream compositions in the course of the stationary distillation process.



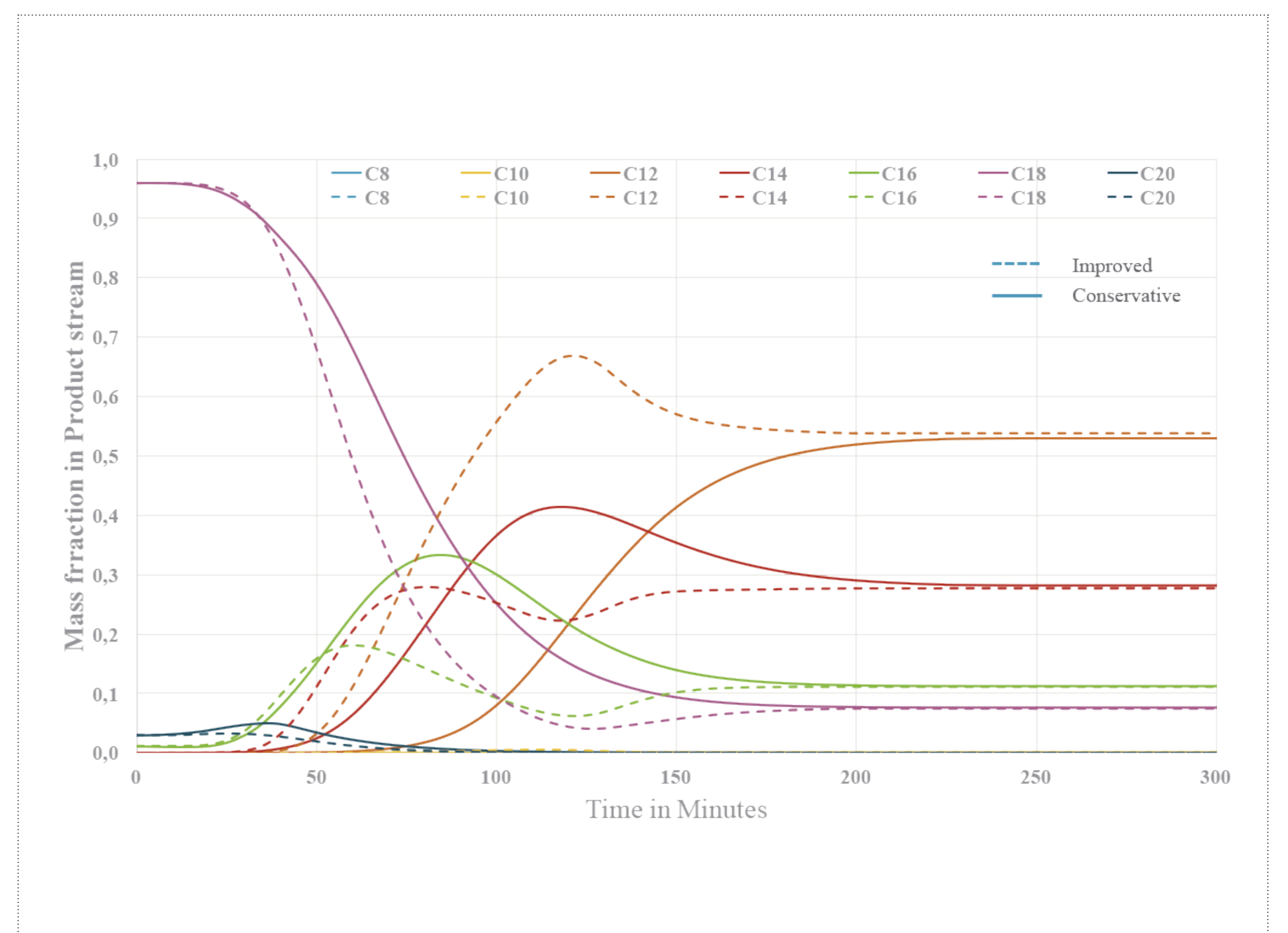
Distillation system



TASK

The goal of PSC2015 is to arrive at optimal trajectories for the operation parameters, so that the changeover time is minimized for a feed change with given product specifications in a defined two-step distillation process. The operation parameters are the reflux ratios and the reboiler duties of the two columns. Heat transfer and cooling water constraints must be considered.

Temporal progression of the product composition using a conservative and an improved changeover strategy



SUMMARY

PSC2015 challenges students with a real-life dynamic optimization problem. The example from the oleochemical industry of a flexible production facility highlights the importance of optimization studies in effective production management. It also tests students' knowledge in dynamic simulation and distillation.

PSC FEATURES

- Open to bachelor, masters, Ph.D. students
- Open to CHEMCAD users and non-users
- Tasks developed with real industry data
- Fully automated online contest
- Worldwide entry all year long
- Unlimited number of participants
- Unlimited number of submissions
- Calculations displayed in real-time
- Full process description and flowsheets provided

PSC AWARDS

- Professional CHEMCAD Training
- Certificates & Vouchers
- Recognition on PSC website

