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Data-driven robust optimisation for biodiesel production

Lukas Olenborg

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Thesis advisor: *Prof. Fabricio Oliveira*

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laboratorio

Biodiesel

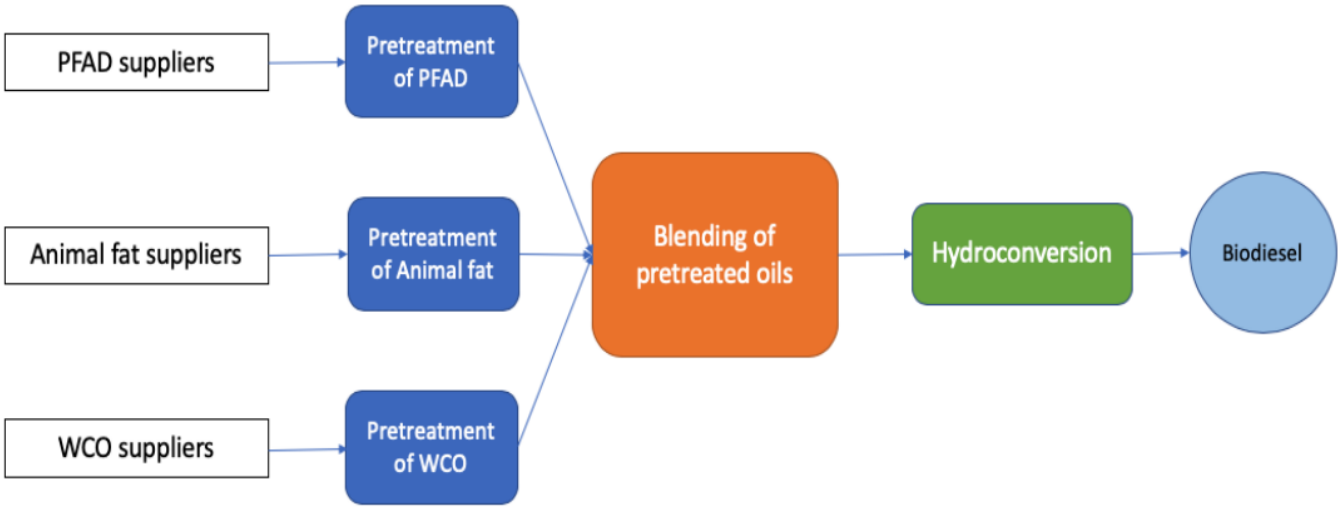
- Renewable, environmentally friendly
- Effect on food price
- Raw materials for biodiesel production
  - Animal fats
  - Waste cooking oils
  - PFAD

The problem

- The raw materials (biomass) come from many small suppliers
- Suppliers have uncertainty in production capacity
  - Seasonality, restaurant customers, etc.
- Planning and optimisation of the supply chain is difficult
- Leads to overbuying and an inefficient supply chain

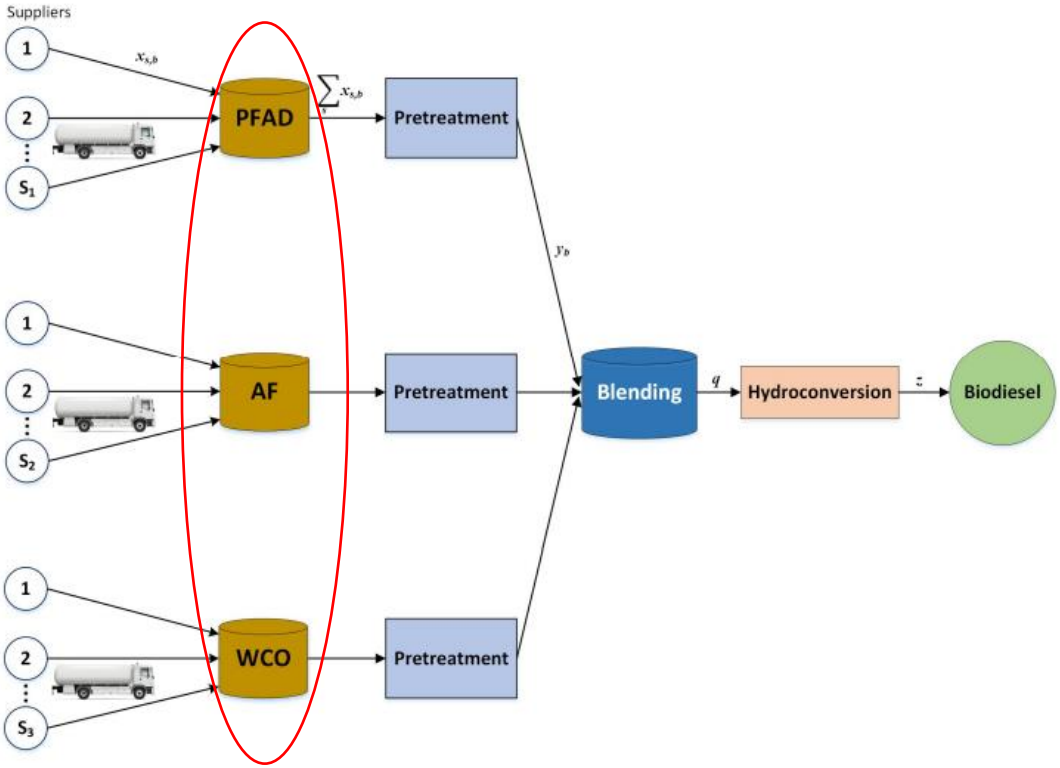
Background / Previous work

- Previous bachelor thesis with simple model



Background / Previous work

- Current work with more complex model



Goal

- *Data-driven robust optimisation model*

- Reformulate non-convex non-linear MIP
  - Linear MIP approximation (NMDT)
- Propose robust model based on linearised deterministic model
- Conduct a case study (Julia code)
- Comparison with previous models and results

- Model applicable to real biodiesel supply chains (long term)

Schedule

- Presentation of topic: 22.10.2021
- Practical work: Fall 2021
- Presenting results: 2.12.2021 or 21.1.2022
- Writing thesis: Fall 2021 (+ Jan 2022)

Literature and References

- Previous bachelor thesis
- Current work on second model

- Dai et al. (2019) *Data-driven robust optimization for crude oil blending under uncertainty*
- Shang et al. (2017) *Data-driven robust optimization based on kernel learning*
- Pedro M. Castro (2015) *Normalized multiparametric disaggregation: an efficient relaxation for mixed-integer bilinear problems*