Universität Stuttgart
Institute of Nuclear Technology
and Energy Systems

Bachelor or Master Thesis

Thermodynamic Optimization of a Recompression sCO_2 Cycle

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Objective:

The objective of this work is to further develop and improve the calculation routines for the thermodynamic design and optimization of a supercritical (sCO_2) recompression cycle.

Background:

sCO_2 is a promising working medium for various next-generation applications, both in the field of renewable and conventional power generation (project sCO2-flex, SOLARSCO2OL, ShunShot, Misha) and in residual heat removal (project sCO2-4-NPP).

Within the scope of this work, the thermodynamic design of a recompression sCO_2 cycle is investigated and optimized under various boundary conditions and constraints. Starting from existing Matlab routines, the stability, accuracy and speed of the calculation is improved. Then, the optimized thermodynamic design is determined for different boundary conditions and constraints.

Approach:

- Literature study on recompression sCO_2 cycles
- Familiarization with the existing Matlab code
- Improvement of the code (e.g. stability, accuracy and speed)
- Optimization considering different boundary conditions and constraints
- Thesis preparation and presentation

Requirements:

- Fundamentals of thermodynamics
- Experience in programming preferably in Matlab
- Analytical thinking and self-initiative

Start: as soon as possible

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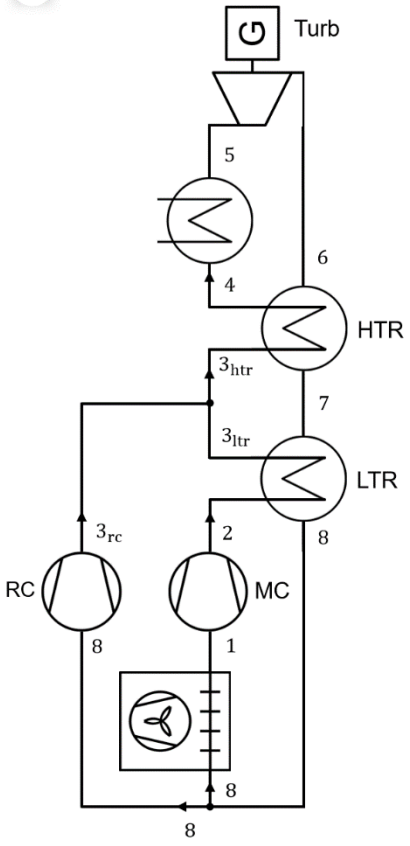

Figure 1: Recompression sCO_2 cycle

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