
Enumeration and selection of structurally similar coil designs used in air conditioners

Sudhakar Munusamy
Technical Lead (Process
Technology)
Gyan Data Private Limited
Chennai-600113 India
sudhakar.munusamy@gyandata.com

Problem

Mitsubishi (MERL) desired to increase the effectiveness of their current cooling system by employing novel coil designs to circulate the refrigerant. In relation to this MERL approached GDPL to systematically enumerate all possible coil designs considering all practical scenarios such as splitting the flows, plugging certain tubes, having more than one inlet and outlet etc. In addition MERL also wanted to find structurally similar coil designs for a given base coil design.

Solution

GDPL established a super structure framework for representing all the coil designs and coded the idea using MATLAB for the enumeration. The enumeration was systematic and it captured all the possible coil designs for a given number of cooling tubes. GDPL also designed a metric to extract structurally 'similar designs' for a given design from this enumerated ones. These 'similar' coil designs would help in identifying minimal changes to the existing design while increasing the cooling capacity.