A Double Pinch Criterion for Optimization of Regenerative 
Rankine Cycles: Powerplant Operation and 
Simulation/Optimization Software Modeling Strategies
Technology #14875

Applications

- Control method and algorithm for optimizing design and operation of Rankine cycles

Problem Addressed

Conventional and currently-implemented procedures for the operation of regeneration in Rankine cycles are suboptimal. Moderate improvements in efficiency (such as the ones obtained by this technology) have dramatic impacts on cost of electricity production and profitability.

Technology

The invention describes a new way to operate bleeds and feedwater heaters that result in optimized operation of regenerative Rankine cycles. It is based on a double-pincher criterion for closed feedwater heaters and works for different feedwater configurations. It also introduces a computation algorithm to improve simulation and optimization that can be used in any power plant modeling software.

Advantages

- Easy to implement in new plants and operating plants
- Requires no capital costs to implement and immediately applicable
- Criterion is also beneficial for heat exchange and integration where working fluids are not identical
- In simulation and optimization software, the criterion reduces time and memory requirements while eliminating errors and failures and avoids convergence to suboptimal local optimum

Categories For This Invention:

Energy
Heat Exchangers

Intellectual Property:

Double pinch criterion for optimization of regenerative rankine cycles
Issued US Patent
9,091,183
Double pinch criterion for optimization of regenerative rankine cycles
Issued US Patent
9,719,379
Inventors:
Alexander Mitsos
Hussan Zebian

External Links:
MIT-SOS-Lab
http://mitsoslab.scripts.mit.edu/

Image Gallery: