

Exergy Analysis of Regenerative Organic Rankine Cycle Using Turbine Bleeding

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Abstract : This work presents an exergetical performance analysis of regenerative organic Rankine cycle (ORC) using turbine bleeding based on the second law of thermodynamics for recovery of finite thermal energy. Effects of system parameters such as turbine bleeding pressure and turbine bleeding fraction are theoretically investigated on the exergy destructions (anergies) at various components of the system as well as the exergy and the second-law efficiencies. Under the conditions of the critical fraction of turbine bleeding, the simulation results show that the exergy efficiency decreases monotonically with respect to the bleeding pressure, however, the second-law efficiency has a peak with respect to the turbine bleeding pressure.

Keywords : organic Rankine cycle, ORC, regeneration, turbine bleeding, exergy, second-law efficiency

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