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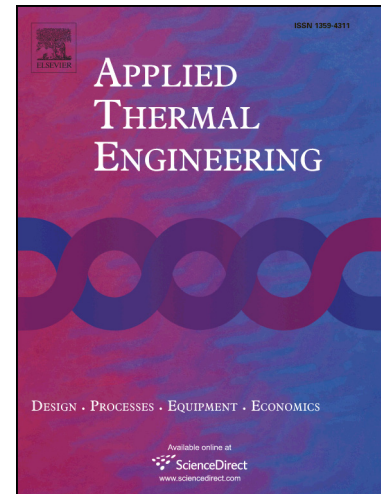
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Thermodynamic modeling and performance analysis of four new integrated organic Rankine cycles (A comparative study)

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Abstract

Due to environmental pollution and limitation of the fossil fuels, renewable energy resources can be considered as the main alternative for these nonrenewable resources. Since the organic Rankine cycle (ORC) uses organic working fluids and low grade heat sources (LGHSs) to generate power, its usability is limited due to low thermal efficiency in the industry. Thus, in order to improve the thermal efficiency and net power production of the ORC, four new modified ORCs are proposed: ORC with an ejector (EORC), ORC with an ejector and a regenerator (ERORC), ORC with an ejector and a feed fluid heater (EFFHORC), and ORC with an ejector, a regenerator and a feed fluid heater (ERFFHORC). In the EORC, an ejector and a two-stage evaporator has been integrated into the simple ORC. In the ERORC, an ejector, a regenerator with a two-stage evaporator have been integrated into the simple ORC in order to modify two previous cycles. Steam enters to the regenerator prior to the ejector and supply a part of the energy requirement of the first-stage evaporator. The EFFHORC incorporates with an open feed fluid heater, an ejector, and a two-stage evaporator as well as the basic ORC. Steam from the second-stage evaporator enters to ejector as a primary fluid and then its pressure is

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