Design optimization of dual mixed refrigerant natural gas liquefaction process

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An optimization of the dual mixed refrigerant (DMR) natural gas liquefaction (LNG) process involves highly non-linear interactions between decision variables, constraints, and the objective function. These non-linear interactions lead to an irreversibility, which deteriorates the energy efficiency of the liquefaction process. In this study, a newly developed single-solution based metaheuristic vortex search optimization algorithm is examined for the optimization of the DMR process, which is modeled in Aspen Hysys® and then connected to MATLAB in which algorithm is coded. The optimal operating conditions found by the proposed optimization methodology reduces the significant amount of required energy for the DMR process in comparison with the base DMR case.