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An Optimization Design of A 20 K Helium Cryoplant Based On the Genetic Algorithm

The first large scale helium cryoplant with the cooling capacity of 10kW@20K has been successfully developed recently. Considering the large power consumption of this system, energy saving is very important. In this paper, a model which is described with Genetic Algorithm (GA) program and written in VC++ is established to simulate the cryoplant process. In this model, the pressure ratio and expansion ratio are the parameters to be optimized, while the exergy efficiency is set as the evaluation criteria. The results show that it is feasible to adjust some of the thermal variables to improve the efficiency of the system. This method based on the GA is highly efficient in searching the optimal solution and at last the efficiency of the large scale refrigeration system is improved to a great extend.

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