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C2Po1F-01: Flow rate optimization for a small liquid argon system at Fermilab.

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Noble Liquid Test Facility (NLTF) at Fermilab is dedicated to the research and development of liquid argon neutrino detectors. The liquid argon is provided by a small cryogenic system supplying four cryostats. Multiple modifications of the cryogenic system over the years resulted in limited performance with respect to the liquid argon flow rate. The time required to fill the cryostats has significantly increased with no obvious cause, leading to delays in research efforts. The paper describes the development of the two-phase hydrodynamic model of the cryogenic system, the investigation of parameter sensitivity, and optimization. The optimized model indicates limiting factors and provides recommendations for the upcoming upgrade of the cryogenic system.

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