

## Genetic Algorithm Optimization of a Small Scale Natural Gas Liquefaction Process

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**Abstract :** An optimization scheme based on COM server is suggested for communication between Genetic Algorithm (GA) toolbox of MATLAB and Aspen HYSYS. The structure and details of the proposed framework are discussed. The power of the developed scheme is illustrated by its application to the optimization of a recently developed natural gas liquefaction process in which Aspen HYSYS was used for minimization of the power consumption by optimizing the values of five operating variables. In this work, optimization by coupling between the GA in MATLAB and Aspen HYSYS model of the same process using the same five decision variables enabled improvements in power consumption by 3.3%, when 77% of the natural gas feed is liquefied. Also on inclusion of the flow rates of both nitrogen and carbon dioxide refrigerants as two additional decision variables, the power consumption decreased by 6.5% for a 78% liquefaction of the natural gas feed.

**Keywords :** stranded gas liquefaction, genetic algorithm, COM server, single nitrogen expansion, carbon dioxide pre-cooling

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