Abstract

Optimization of large gas trunk-lines known as IGAT results in reduced fuel consumption or higher capability and improves pipeline operation. In the current study, Single and Multi-objective optimizations were conducted for a compressor station comprising four similar compressor units driven by four similar gas turbines, four coolers of the same size and a pipeline section to the next station. This pipeline section is on the 2th major gas transmission pipeline of the National Iranian Gas Company, NIGC, or IGAT2 which is designed to move over 79 MMSCMD (2.8 BCFD) of natural gas from the Assaluyeh Gas Refinery to the ports. Genetic, Particle Swarm and SQP Algorithms were used in this optimization along with detailed modeling of the performance characteristics of compressors, aerial coolers, and downstream pipeline section. The results showed that, for stations having the same compressor in parallel, the minimum fuel (energy) consumption is reached when split flows in all compressors are the same. By the way, it can save fuel consumption in the order of 2-4 % by adjusting unit load sharing and coolers downstream temperatures slightly. It appears that most of the savings (around 70–75%) are derived from optimizing the load sharing between the four parallel compressors. Also PSO algorithm reached better and faster results than two other algorithms.
References


Index Terms

Computer Science

Algorithms
Keywords
Compressor Station  Single and multi-Objective Optimization  Particle Swarm Optimization (PSO)
Genetic Algorithm (GA)
Sequential Quadratic Programming (SQP)