# Optimal Control of Fuel Processing System Using Generalized Linear Quadratic Gaussian and Loop Transfer Recovery Method

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## Abstract

This paper proposes an optimal control system that consists of both feedforward and state-feedback controllers designed using a generalized linear
quadratic Gaussian and loop transfer recovery (GLQG/LTR) method for a fuel processing system (FPS). This FPS uses natural gas as fuel and reacts with atmospheric air through a catalytic partial oxidation (CPO) response. The control objective is focused on the regulatory performance of the output
vector in response to a desired stack current command in the face of load variation. The proposed method provides another degree of freedom in the optimal control design and gives the compensated system a prescribed degree
of stability. Finally, the numerical simulations of compensated FPS reveal that
the proposed method displays better performance and robustness properties in both time-domain and frequency-domain responses than those obtained by the traditional LQ Method.

Keyword：GLQG/LTRmethod, catalytic partial oxidation, fuel processing