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A Resilience Process Model of Natural Gas Pipeline Systems

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Abstract : Resilience is one of the key factors for system safety assessment and optimization, and resilience studies of natural gas pipeline systems (NGPS), especially in terms of process descriptions, are still being explored. Based on the three main stages, which are function loss process, recovery process, and waiting process, the paper has built functions and models which are according to the practical characteristics of NGPS and mainly analyzes the characteristics of deterministic interruptions. The resilience of NGPS also considers the threshold of the system function or users' satisfaction. The outcomes, which quantify the resilience of NGPS in different evaluation views, can be combined with the max flow and shortest path methods, help with the optimization of extra gas supplies and gas routes as well as pipeline maintenance strategies, the quick analysis of disturbance effects and the improvement of NGPS resilience evaluation accuracy.

Keywords : natural gas pipeline system, resilience, process modeling, deterministic disturbance
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