

Abstract

STABILITY MODEL FOR AN OFFSHORE GAS PROCESSING FACILITY

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The intent of this undertaking is to develop a stability model for an offshore gas processing facility. The available literature shows that Frequency Stability is of greatest concern for islanded power systems, under which offshore gas processing facilities are classed.

Via the infusion of actual platform data, a stability model is developed. The proposed model also yields a control strategy to address the stability issue. This strategy hinges upon the behavior of system trajectories within a $\Delta\omega$ - $\Delta\dot{\omega}$ phase-plane, which guarantees the stable operation of the system when subjected to disturbances.

Four (4) unique scenarios are applied to the model to investigate the stability behavior of the system. The results show that the control strategy sheds load in a conservative manner, as opposed to traditionally employed deterministic methods. Furthermore, the analysis reveals that system damping strongly influences system directionality within the $\Delta\omega$ - $\Delta\dot{\omega}$ phase-plane, thereby affecting stability and thus, the quota of load shed.

Based upon the simulation results, an analysis is conducted to compare the application of the proposed scheme with respect to a commercially available software package. The treatment of the results culminates with a brief insight to the mechanisms required to implement such a scheme, together with the possible benefits and drawbacks associated with system integration.

Keywords: Reynaldo King; Frequency Stability; Power Systems Analysis; Natural Gas industry; Load Shedding; Industrial Applications.