

Determination Of First Swing Stability Limit Of Multimachine Powersystems Through Taylor Series Expansions

Haque, M.H. Rahim, A.H.M.A.;Dept. of Electr. Eng., King Fahd Univ. of PetroleumMiner., Dhahran;

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King Fahd University of Petroleum & Minerals

<http://www.kfupm.edu.sa>

Summary

A new technique of determining first swing stability limit of a power system through checking the existence of peaks of rotor angles of the severely disturbed generators in the postfault period is presented. The existence of peaks is checked by observing the roots of time derivatives of rotor angles of these generators expressed through truncated Taylor series expansions. The stability limit and hence the critical clearing time corresponds to the maximum value of fault duration for which at least one of the roots of the derivative of the angle is real positive. The proposed method has been tested on four different power networks and the critical clearing times obtained were found to be in very good agreement with those obtained by simulation of system dynamics. The method is computationally very fast compared with the existing methods

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