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Envision, Enable, and Empower  
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## A FAST CONTINGENCY SCREENING TECHNIQUE WITH REGRESSION MODEL IMPLEMENTATION FOR ON-LINE TRANSIENT STABILITY ASSESSMENT

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### ABSTRACT

The study develops a fast, simple and comprehensive methodology for on-line power transient stability assessment for the case of fault disturbances in the power transmission system. The proposed method is based on a Hybrid Method that combine the Direct-method and the Numerical Method. In this study, we focus on implementation of the on-line Contingency screening method. We aim to build a regression model between the proposed indices and the Critical Clearing Time (CCTs). Three indices are proposed; the first one (KeI) is based on the difference of the Transient Kinetic Energy at the fault clearing time and the observation time, the second one is the Rotor Angle increment (AI), and the last one is the Absolute Angle Increment (AbAI) which is a modified one from AI index. There are two major parts for the methodology; Off-line and On-line calculation. For the off-line section, first, we calculate the Critical Clearing Time (CCT) by using Time Domain (TD) simulation with 5 seconds time of simulation. Then, from the TD simulation, we are able to compute the indices (KeI, AI & AbAI). With this computation, the regression model relationship between the indices and CCT are built. For the on-line part, we only simulate for a shorter time than we do in off-line simulation in order to compute the indices. After that, the CCT will be determined by using the regression equation obtained from the off-line study. Finally, we judge the system stability by the margin of the fault clearing time from the critical clearing time. IEEE 39-Bus 10-Machine system will be our test system for evaluating the accuracy of the proposed method.

**Keywords:** Contingency Screening, Transient Stability Assessment (TSA), Transient Kinetic Energy.

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