عنوان مقاله:

Thevenin Impedance Concept for Fast Detection of Microgrid Islanding Scenarios in the Presence of Small Synchronous Generators

محل انتشار:

مجله بهره برداری و اتوماسیون در مهندسی برق, دوره 12, شماره 2 (سال: 1403)

تعداد صفحات اصل مقاله: 16

نویسندگان:

I. Sepehrirad - *Department of Electrical Engineering, Gorgan Branch, Islamic Azad University, Gorgan, Iran*

R. Ebrahimi - *Department of Electrical Engineering, Gorgan Branch, Islamic Azad University, Gorgan, Iran*

E. Alibeiki - *Department of Electrical Engineering, Aliabad Katoul Branch, Islamic Azad University, Aliabad Katoul, Iran*

S. Ranjbar - *Department of electrical engineering, Velayat University, Iranshahr, Iran*

خلاصه مقاله:

Modern power systems deal with different stability concerns due to operation near to their critical margins. Implementing the small energy resources and online islanding schemes perform as a modification scheme for increasing the system overall stability. This paper presents an adaptive approach for online detection of islanding microgirds in the presence of renewable energy resources consisting of diesel generators. For this issue, based on the concept of thevenin impedance, the microgrid impedance matrix is evaluated. In this case, considering the system angular frequency as an online index within different operating conditions, the islanding operating cases are identified. The proposed scheme uses an online non-model-based index which provides high impedance values in the case of grid-connected operating mode. Through continuous time window, the system impedance derivatives-based matrix is provided which islanding operating scenarios are estimated. In this case, considering a set of analytical evaluations, the required adaptive parameters and corresponding online adjustments are provided. The proposed approach is carried out through a modified microgrid test system consisting of synchronous generators which considering different cases studies, the proposed scheme ability is evaluated. It is revealed that through different case studies about ۱۰۰ ms time duration is required to estimate an islanding operating condition which the proposed MICI index goes lower than criteria. Simulation results dedicate the effectiveness of the proposed approach for online and fast identification of .islanding scenarios with respect to other corresponding techniques

کلمات کلیدی:

Islanding identification, Microgrid, Synchronous generators, Thevenin impedance matrix