

Abstract

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Artificial Neural Network based DC-link Capacitance Estimation in a Diode-bridge Front-end Inverter System

In modern design of power electronic converters, reliability of DC-link capacitors is an essential aspect to be considered. The industrial field have been attracted to the monitoring of their health condition and the estimation of their ageing process status. The existing condition monitoring methods suffer from shortcomings such as, low estimation accuracy, extra hardware, and increased cost. Therefore, development of new condition monitoring methodologies that are based on advanced software algorithms could be the way out of the aforementioned challenges and shortcomings. In this digest, a proposed software condition monitoring methodology based on Artificial Neural Network (ANN) algorithm is presented. Matlab software is used to train and generate the proposed ANN. The proposed methodology estimates the capacitance of the DC-link capacitor in a three phase front-end diode bridge AC/DC/AC Simulink converter model. The estimation is based on the usage of single phase output current and dc-link voltage ripple. The impact of training data type and amount are also investigated for estimation accuracy analysis. Experimental validation of the proposed method is also given.