Determining the Magnetization Characteristic of a Three-Phase Star-Star Transformer Using Inrush Current Waveforms

IU Jalthotage, CD Aluthge#, KDOV Dharmawardene, KAL Wijeratne and JR Lucas

Department of Electrical, Electronic and Telecommunication Engineering,
Faculty of Engineering, General Sir John Kotelawala Defence University, Sri Lanka
#devin.aluthge@gmail.com

This paper presents a novel approach for the determination of the Magnetization Characteristic of a Three-Phase Transformer whose core characteristics are unknown. The magnetization characteristics of many old installed transformers in the Sri Lankan power system are generally unknown and may even be different from that at the time of installation. The need for a reliable method to determine the magnetization characteristics of the transformer core is of great importance for life cycle management of installed three-phase transformers. The primary focus of the research is to plot the magnetization characteristic, including the saturation region, using simultaneously measured inrush current and voltage waveforms. In this paper the magnetizing characteristic is estimated in a three-phase star-connected transformer. Results obtained via the utilized approach demonstrated a close comparison with available research examined. The research concludes confirming that the use of inrush current and flux waveforms of a star-connected transformer could be employed to acquire the magnetizing curve and the no load loss. Thus, the equivalent circuit of the transformer could be determined.

Keywords: Three Phase Transformer, Magnetizing Characterises, Inrush Current, Flux, Voltage