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Small signal stability assessment of the Eskom network based on measurements

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Abstract

Low frequency oscillations between the ranges of 0.1Hz and 3.0Hz are inherent in power systems. These low frequency oscillations are directly related to the small signal stability of the power system and its ability to function as designed under their constant presence within the power system. This dissertation presents an investigation into the small signal stability performance of the Eskom network with the aim of improving the damping performance of a known inter-area network oscillation mode between the (South-) Western Cape and the North-Eastern Mpumalanga regions. The most cost effective method of damping out these low frequency oscillations is through the use of power system stabilizers. The damping performance of the inter-area oscillation mode of concern was achieved through re-designing the power system stabilizer parameters for stabilizers currently installed within the Eskom network. The designed power system stabilizers were then tested under various network contingencies to ensure that their performance was optimal over a wide range of system conditions.