Modelling, Faults Detection and Diagnosis of Squirrel-Cage Self Excited Induction Generator for Isolated Wind Energy Conversion System

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Abstract : The condition monitoring of the Squirrel-cage Self-Excited Induction Generator (SEIG). can significantly reduce the costs of maintenance, prevent the unscheduled downtimes and make the best maintenance decisions for isolated Wind Energy Conversion Systems (WECS). On the other hand, growing attention has been paid to fractional calculus theory in practical control field for many industrial applications. In this paper, an on-line diagnostic procedure for stator and rotor faults in the squirrel SEIG of isolated wind energy conversion system is presented. This diagnostic procedure is based on stator current analysis by FFT. A generalized model of the squirrel-cage SEIG is developed to simulate both the rotor and stator faults taking iron loss, cross flux saturation into account. Additionally, a new control strategy is proposed for the fixed operation of the wind turbine, based on fractional PI? controllers.