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未定

汽轮发电机转子匝间短路故障下的谐波检测研究

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摘要
本文首先分析了汽轮发电机励磁绕组的磁动势分布，通过分析建立起了磁动势数学模型。然后进一步分析了转子匝间短路引起的励磁磁动势分布变化，提出将短路后的励磁绕组磁势看作短路前的励磁绕组磁势和短路匝通过反向励磁电流产生的磁势的叠加，由于前者是完全对称的，于是只对短路匝产生的反向磁势进行分析，通过傅立叶分解得到各次谐波组分，在考虑气隙偏心的情况下得到定子感应电势，理论推导证明偏心对定子绕组感应电动势并不产生影响。定子三相对称电流合成了新的旋转磁动势，并同时在定子、转子绕组中感应谐波，其特征频谱不同于正常运行。最后通过实验验证了理论分析的正确性，确立了通过谐波检测的方法诊断汽轮发电机转子匝间短路故障。

关键词　发电机　匝间短路　磁动势　谐波

分类号

Research on Diagnosis of Inter Turn Short-Circuit Fault of Turbo-Generator Rotor Winding Based on Harmonics Detection

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Abstract
Firstly, the magnetic motive force distribution of the steam turbine generator excitation windings was analyzed, and the mathematic model of MMF was established. Then the change of MMF caused by rotor inter-turn short circuit was examined, and the MMF after inter-turn short circuit happens as the superposition of the normal MMF before inter-turn short circuit happens and the MMF produced by short circuit turns with opposite excitation current. As the former is completely symmetrical, only the opposite MMF produced by short turns was analyzed, and harmonic components with various orders were gained by Fourier analysis. The electromotive force induced in stator windings was got considering the air-gap eccentricity, and the theoretical deduction illustrate that the eccentricity has no influence on the induced electromotive force of the stator windings. The three-phase symmetrical currents of the stator produced a new revolving magnetic motive force, and induced harmonics in rotor windings, whose characteristic spectrum differs from that in normal conditions. The theory was validated by experiments at last and the method that employs harmonics detection to diagnose the inter-turn short circuit malfunction of the steam turbine generator was established.

Key words　Generator　Inter-turn short circuit　Magnetic motive force　Harmonics

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