Ain Shams University – Faculty of Engineering
Electrical Power and Machine Department

MOTOR CURRENT SIGNATURE ANALYSIS-APPLICATION ON INDUCTION MACHINE

By

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B.Sc. of Electrical Power and Machine Engineering

Submitted Thesis for the Degree of M.Sc. in Electrical Power and Machine Engineering

2011

Supervised by

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STATEMENT

This thesis is submitted to Ain Shams University for the degree of M.Sc. in Electrical Power and Machine Engineering.

The included work in this thesis has been carried out by the author at the Electrical Power and Machines Department, Ain Shams University. No part of this thesis has been submitted for a degree or a qualification at any other University or Institution.

Name : Ahmed Khalid Ibrahim El Said.

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Nomenclature

Abbreviations

RF	Radio Frequency.
MCSA	Motor Current Signature Analysis.
MPSA	Motor Power Signature Analysis.
MVSA	Motor Voltage Signature Analysis.
SVAF	Space Vector Angular Fluctuation.
UMP	Unbalanced Magnetic Pull.
PWM	Pulse Width Modulation.
FFT	Fast Fourier Transform.
MMF	Magneto motive force

Symbols

$V_{AB}(t)$	Phase A to Phase B instantaneous voltage.
$V_{CB}(t)$	Phase C to Phase B instantaneous voltage.
$I_{A,o}(t)$	Phase A instantaneous line current for healthy motor.
$I_{B,o}(t)$	Phase B instantaneous line current for healthy motor.
$I_{C,o}(t)$	Phase C instantaneous line current for healthy motor.
$I_A(t)$	Phase A instantaneous line current.
$I_B(t)$	Phase B instantaneous line current.
$I_C(t)$	Phase C instantaneous line current.
V_{LL}	Line to Line voltage RMS value.
I_L	Line current RMS value.
ω	Supply frequency in Rad/Sec.

t	Time.
Φ	Power Factor angel.
ω_o	fault characteristic component frequency in Rad/Sec.
m	Modulation index.
I_{dq}	Stator current vector referred to stator dq-axis.
I_d	Direct component of Stator current vector referred to stator dq-axis.
I_q	Quadrature component of Stator current vector referred to stator dq-axis.
P_{AB}	Phase A to Phase B partial power.
P_{CB}	Phase C to Phase B partial power.
$P_{AB,o}$	Phase A to Phase B partial power for healthy motor.
$P_{CB,o}$	Phase C to Phase B partial power for healthy motor.
P_{ABC}	Total power.
$P_{ABC,o}$	Total power for healthy motor.
P	no of pole pairs.
λ_s	stator flux vector.
λ_{ds}	direct component of stator flux vector.
λ_{qs}	quadrature component of stator flux vector.
V_s	stator voltage vector.
I_s	current voltage vector.
R_s	Stator resistance.
V_0	Stator voltage zero sequence component.
V_1	Stator voltage positive sequence component.