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Performance of Slip Ring Induction Motor using Switched Capacitors in The Rotor Circuit

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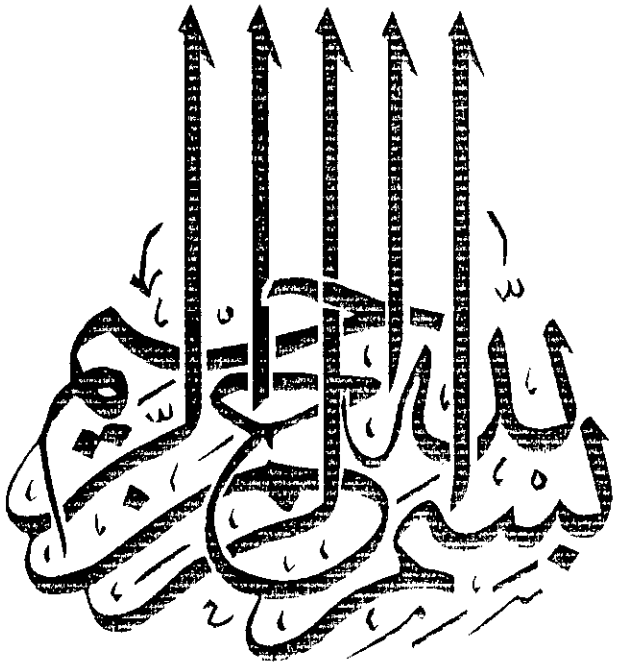
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NOMENCLATURE

β	BJT gain
C_{iss}	MOSFET input capacitance.
C_r	Switched capacitor.
D	Duty cycle .
E	Energy area during turn-off of BJT .
E_1	Stator voltage .
E'_1	R. M. S. rotor voltage per phase at standstill .
E_{dc}	Average value of rectified rotor voltage at standstill.
E_{cl}	Commutation voltage drop.
f_1	Input supply frequency .
f_2	Rotor current frequency.
f_c	Switching frequency .
I_1	Stator input current.
I_2	Rotor current.
I_B	BJT base current.
I_c	BJT collector current .
I_d	Average value of rectified rotor current.
i (t)	Instantaneous capacitor charging current.
M	Stator to rotor turns-ratio.
P_r	Rotor circuit copper loss.
λ_a	Developed torque/maximum torque referred to ac side

λ_d	Developed torque/maximum torque to dc side
R	Resistance .
R_{av}	Effective rotor resistance of switched capacitor controlled resistance .
R_g	MOSFET input resistance.
R_r	Rotor resistance .
R'_r	Effective rotor resistance referred to the stator .
R_s	Stator resistance.
R'_s	Stator resistance referred to the rotor circuit .
S	Slip .
S_1 & S_2	Switches.
T_c	Switching (clock) period.
t_f	Maximum collector fall time.
T_{qa}	Developed torque referred to ac side.
T_{qd}	Developed torque referred to dc side.
T_{qam}	Maximum developed torque referred to ac side.
T_{qdm}	Maximum developed torque referred to dc side.
t_r	Maximum collector voltage rise time.
V_1 & V_2	Independent dc voltage.
V_a	Open circuit voltage.
X_r	Rotor reactance at supply frequency.
X'_r	Rotor reactance referred to the stator.