

## LIST OF SYMBOLS AND ABBREVIATIONS

AC	-	Alternating Current
$i_{ai}$	-	a-phase inverter output current
$i_{ar}$	-	a-phase rotor current
$i_{as}$	-	a-phase stator current
$v_{as}$	-	a-phase stator voltage
$\omega_b$	-	Base speed
$i_{bi}$	-	b-phase inverter output current
$i_{br}$	-	b-phase rotor current
$i_{bs}$	-	b-phase stator current
$v_{bs}$	-	b-phase stator voltage
$\dot{\lambda}_r^r$	-	Change in rotor flux w.r.t in rotor reference frame
$\dot{\lambda}_s^s$	-	Change in stator flux w.r.t in stator reference frame
$V_\alpha$	-	Control voltage
$i_{ci}$	-	c-phase inverter output current
$i_{cr}$	-	c-phase rotor current
$i_{cs}$	-	c-phase stator current
$v_{cs}$	-	c-phase stator voltage
$K_i$	-	Current controller gain
$\tau_i$	-	Current controller time constant
$\tau_{if}$	-	Current filter time constant
$K_{cs}$	-	Current sensor gain
CSI	-	Current Source Inverter
CS-SVM	-	Current Source Space Vector Modulation
$i_{di}$	-	d-axis inverter output current
$\lambda_{dm}$	-	d-axis magnetizing flux

$i_{dr}$	-	d-axis rotor current
$i_{dr}^e$	-	d-axis rotor current in synchronous reference frame
$\lambda_{dr}$	-	d-axis rotor flux
$\lambda_{dr}^e$	-	d-axis rotor flux in synchronous reference frame
$i_{ds}$	-	d-axis stator current
$i_{ds}^s$	-	d-axis stator current in stator reference frame
$i_{ds}^e$	-	d-axis stator current in synchronous reference frame
$\lambda_{ds}$	-	d-axis stator flux
$v_{ds}$	-	d-axis stator voltage
$v_{ds}^s$	-	d-axis stator voltage in stator rotating frame
$v_{ds}^e$	-	d-axis stator voltage in synchronous reference frame
$i_{dr}'^s$	-	d-axis stator-referred rotor current in stator reference frame
$i_{dr}'^e$	-	d-axis stator-referred rotor current in synchronous ref. frame
$I_{dc}, I_d$	-	DC link current
$L_{dc}$	-	DC link inductance
$v_{dc}$	-	DC link voltage
$\alpha$	-	Delay angle or firing angle
DC	-	Direct Current
DTC	-	Direct Torque Control
$T_e$	-	Electromagnetic torque
$I_f$	-	Feedback current form current filter
FLC	-	Feedback Linearization Control
$\theta_f$	-	Field angle
FOC	-	Field Oriented Control
IFOC	-	Indirect Field Oriented Control
IM	-	Induction Motor
$i'_{dr0}$	-	Initial value of d-axis stator-referred rotor current
$i_{qs0}$	-	Initial value of q-axis stator current

$i'_{qr0}$	-	Initial value of q-axis stator-referred rotor current
$\omega_{e0}$	-	Initial value of synchronous speed
IOL	-	Input Output Linearization
$\sigma_m$	-	Leakage factor
$L_l$	-	Leakage inductance referred to the stator side.
$v_{cb}$	-	Line voltage between c and b phases
$T_L$	-	Load torque
$\lambda_m^a$	-	Magnetic flux in arbitrary reference frame
$L_m$	-	Magnetizing inductance
$x_m$	-	Magnetizing or mutual reactance
$J$	-	Moment of inertia of the induction motor and load
$\omega_{mf}$	-	Motor speed from speed filter
$\omega_{me}$	-	Motor speed in electrical radians
$N_r$	-	Number of rotor turns
$N_s$	-	Number of stator turns
$C$	-	Output capacitor
PWM	-	Pulse Width Modulation
$i_{qi}$	-	q-axis inverter output current
$\lambda_{qm}$	-	q-axis magnetizing flux
$i_{qr}$	-	q-axis rotor current
$i_{qr}^e$	-	q-axis rotor current in synchronous reference frame
$\lambda_{qr}$	-	q-axis rotor flux
$\lambda_{qr}^e$	-	q-axis rotor flux in synchronous reference frame
$i_{qs}$	-	q-axis stator current
$i_{qs}^s$	-	q-axis stator current in stator reference frame
$i_{qs}^e$	-	q-axis stator current in synchronous reference frame
$\lambda_{qs}$	-	q-axis stator flux
$v_{qs}$	-	q-axis stator voltage

$v_{qs}^s$	-	q-axis stator voltage in stator rotating frame
$v_{qs}^e$	-	q-axis stator voltage in synchronous reference frame
$i_{qr}'^s$	-	q-axis stator-referred rotor current in stator reference frame
$i_{qr}'^e$	-	q-axis stator-referred rotor current in synchronous ref. frame
$\theta_r$	-	Relative displacement angle of $ar$ axis w.r.t $as$ axis
$R_{dc}$	-	Resistance of dc link inductor
$i_r^a$	-	Rotor current in arbitrary reference frame
$i_r^r$	-	Rotor current in rotor reference frame
$\lambda_r$	-	Rotor flux
$\lambda_r^a$	-	Rotor flux in arbitrary reference frame
RFO	-	Rotor Flux Oriented
$L_r$	-	Rotor inductance
$L_{lr}$	-	Rotor leakage inductance
$x_r'$	-	Rotor reactance referred from stator
$R_r$	-	Rotor Resistance
$R_r'$	-	Rotor resistance referred from stator
$\omega_r$	-	Rotor speed
$v_r^r$	-	Rotor voltage in rotor reference frame
$s$	-	Slip
$\theta_{sl}$	-	Slip angle
$\omega_{sl}$	-	Slip speed
SVM	-	Space Vector Modulation
$K_s$	-	Speed controller gain
$\tau_s$	-	Speed controller time constant
$\tau_{sf}$	-	Speed filter time constant
$K_{ss}$	-	Speed sensor gain
$i_s$	-	Stator current
$i_s^a$	-	Stator current in arbitrary reference frame

$i_s^s$	-	Stator current in stator reference frame
$\lambda_s$	-	Stator flux
$\lambda_s^a$	-	Stator flux in arbitrary reference frame
SFO	-	Stator Flux Oriented
$L_{ls}$	-	Stator leakage inductance
$x_s$	-	Stator reactance
$R_s$	-	Stator resistance
$v_s$	-	Stator voltage
$v_s^s$	-	Stator voltage in stator reference frame
$\omega_e$	-	Synchronous speed
$K_{te}$	-	Torque coefficient
VSI	-	Voltage Source Inverter
VS-SVM	-	Voltage Source Space Vector Modulation
V/F	-	Volts to Frequency
$i_{\alpha s}$	-	$\alpha$ -axis stator current in stationary reference frame
$\lambda_{\alpha s}$	-	$\alpha$ -axis stator flux in stationary reference frame
$i_{\beta s}$	-	$\beta$ -axis stator current in stationary reference frame
$\lambda_{\beta s}$	-	$\beta$ -axis stator flux in stationary reference frame