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## NOMENCLATURE

a, b, p <sub>0</sub> , z <sub>0</sub> , y, N	Approximation parameters
$\xi$	Approximation error
$i_{s(d,q)}$	Stator current in d and q axis
$i_{s(\alpha/\beta)}$	Stator current in $\alpha$ and $\beta$ axis
$L_d, L_q$	Inductances in d and q axis
m	Fractional order
$n_h, n_b$	Asymptotic orders
N	Zero and Pole number
$N_i$	Set of point
K	Gain
$P_i, Z_i$	Pole and Zero of the approximation
$R_s$	Stator resistance
S	Laplace
$S_{(a,b,c)}$	Three switches of two level converter
$T_e$	Electromagnetic torque
$T_r$	Load torque
$U_{an}, U_{bn}, U_{cn}$	Tree phase voltage inverter
$V_{dc}$	DC-link voltage
$V_{(d/q)}$	Voltage in d and q axis
$V_s$	Stator voltage
$V_{s(\alpha/\beta)}$	Stator voltage in $\alpha$ and $\beta$ axis
$n_b$ and $n_h$	low and high frequency

## Greek symbols

$\lambda, \gamma$	Non-integer orders
$\theta_m$	Phase margin
$\omega_u$	Gain crossover frequency
$\Phi_{(d/q)}$	Flux linkage in d and q axis
$\Phi_m$	Permanent Magnitude flux
$\Phi_s$	Stator flux
$\Phi_{s(\alpha/\beta)}$	Flux linkage in $\alpha$ and $\beta$ axis
$\Omega_r$	Rotor speed

## Abbreviations

FOC	Fractional order Control
PMSM	Permanent Magnet Synchronous Machine
PID	Proportional Integral Derivative Controller
$PI^{\lambda}D^{\gamma}$	Fractional Proportional Integral Derivative
DTC	Direct Torque Control
VSI	Three-phase Voltage Source Inverter