

LIST OF SYMBOLS

Symbol	Nomenclature
H	inertia constant ($M = 2H$)
ω_s	Synchronous speed
D	Damping coefficient
P_e	Electrical real power of the generator
Q_e	Electrical reactive power of the generator
P_m	Mechanical power input to the generator
\tilde{T}_{d0}	Direct axis open-circuit time-constant of the generator
X_E	Reactance of excitation transformer (ET)
X_B	Reactance of boosting transformer (BT)
δ_E	Phase angle of shunt-convertor voltage
δ_B	Phase angle of series-convertor voltage
m_E	Modulation index of shunt convertor
m_B	Modulation index of series convertor
d, q	Quantities in d-axis and q-axis for voltage, current, reactance
V_{Bt}	Value of series-injected voltage
V_{Et}	Value of shunt-injected voltage
i_B	Current through boosting convertor
i_E	Current through exciter convertor
v_t	Terminal voltage of the generator
V_{dc}	Voltage at DC link
C_{dc}	DC link capacitor
T_1, T_2, T_3, T_4	Time constant of controllers
T_W	Time constant of washout
T_A	Time constant of exciter system
X_{tE}	Reactance of transformer
V_b	Infinite bus voltage

K_A	AVR gain
X_{Bv}	Reactance of the transmission line
X_d	Direct axis steady-state synchronous reactance of generator
\dot{X}_d	Direct axis transient synchronous reactance of generator
X_e	Equivalent reactance of the system
X_q	Quadrature axis steady-state synchronous reactance of generator
ω_n	Natural frequency of oscillation (rad/sec)
f	Frequency (Hz)
K_{Pod}	Gain of damping controller
K_{PSS}	Gain of power system stabilizer
V_R	Sinusoidal reference signal
A_R	Amplitude of sinusoidal reference signal
V_C	Saw tooth carrier wave
A_C	Amplitude of saw tooth carrier wave
V_{Pq}	Magnitude of controllable injection voltage
Ψ	Phase angle of controllable injection voltage
V_{OEL}	Over excitation voltage limit
V_{UEL}	Under excitation voltage limit
V_{REF}	Reference excitation voltage
V_{PSS}	Power system stabilizer output signal
E_{FDmax}	Maximum limit of field winding voltage
E_{FDmin}	Minimum limit of field winding voltage
U_S	Damping controller output signal
U_{Smax}	Maximum limit of damping controller output signal
U_{Smin}	Minimum limit of damping controller output signal
V_X	Drop voltage across the transmission line
\dot{E}_q	Internal voltage of generator
E_{FD}	Field winding voltage