List of Acronyms

C	Converge factor
D	Damping torque coefficient
E_{fd}	Excitation field voltage
$E_{g,}$	Generator EMF
G	Generator
H	Inertia moment coefficient
I	Current, amp
J	Fitness function
K1, K2	Constants derived from electrical torque
K3, K4	Constants derived from field voltage equation
K5, K6	Constants derived from terminal voltage magnitude
KA	Voltage regulator gain
M	Inertia coefficient
M_1	Machine 1
M_2	Machine 2
P	Active power, p. u.
Q	Reactive power, p. u.
r	System input
S	Transfer function operator
T'do	Transient open circuit time constant
T_m, T_e	Mechanical and electrical torque, N m
T_w	Washout time, sec
V_A	AVR voltage, volt
W	Weight, kg
X_d, X_q	Synchronous reactance in d and q axis
$X_{g,}$ X_L	Reactance of generator and transmission line
$X_{1,}$ X_2	Input layer 1 & 2 for ANN
y	System output
Z	Impedance

Abbreviations

ANN	Artificial Neural Network
ANFIS	Adaptive Neuro-Fuzzy Inference System
ASICS	Application Specific Integrated Circuits
AVR	Automatic Voltage Regulator
BKP	Back Propagation algorithm
CCS	Code Composer Studio
COS	Centre of Sum
CPU	Central Processing Unit
CPSS	Conventional Power System Stabilizer
DSP	Digital Signal Processor
EMF	Electro Motive Force
FIS	Fuzzy Inference System
FLC	Fuzzy Logic Controller
FPGA	Field Programmable Gate Arrays
GA	Genetic Algorithm
GPIO	General Purpose Input Output
GSC	Gain Scheduling Control
HIL	Hardware In Loop
HLC	Heavy Loading Condition
HTG	Hydraulic Turbine and Governor
HVDC	High Voltage Direct Current
IAE	Integral of Absolute Error
IP	Parameter Index
ISE	Integral of Squared Error
ISTSE	Integral of Squared time Squared Error
ITAE	Integral Time Absolute Error
LLC	Light Loading Condition
LTI	Linear Time Invariant
MMAC	Multiple Model Adaptive Controller
MLP	Multi Layer Perceptron
MF	Membership Function
MOM	Mean of Maxima

MOPSO	Multi Objective Particle Swarm Optimization
MRAC	Model Reference Adaptive Controller
NLC	Normal Loading Condition
NSGA	Non dominated Sorting GA
PID	Proportional Integral Derivative
PIL	Processor In Loop
PPE	Posterior Probability Evaluator
PSS	Power System Stabilizer
RAM	Random Access Memory
RNNC	Recurrent Neural Network Controller
ROM	Read Only Memory
RTDX	Real Time Data Exchange
SISO	Single Input Single Output
SIL	Software In Loop
SMIB	Automatic Voltage Regulator
STR	Self-Tuning Regulator
SVC	Static Var Compensator

Greek Symbols

Ψ_{fd}	Field circuit flux linkage
ω	Angular speed
δ	Rotor angle
η	Learning coefficient
μ	Momentum factor
ξ	Training Error

Subscript

k_{STAB}	Stabilizer gain
V_t	Terminal voltage
T_m	Mechanical torque
P_{ref}	Reference power
T_e	Electrical torque

R_e	Resistance of SMIB system
X_e	Reactance of SMIB system
ω_n	Natural frequency of oscillations
O_s	Maximum overshoot
t_r	Rise time
t_p	Peak time
t_s	Settling time