LIST OF SYMBOLS AND ABBREVIATIONS

A  System matrix
AK  Governor amplifier gain
B  Control matrix
Cv  Effective governor controlled valve gate position
D  Damping constant
E  Voltage proportional to flux linkage of any machine
\( E_{fd} \)  Open circuit excitation voltage
\( E_i \)  Internal voltage of the ith machine
\( E_{Qe}, E_{qe} \)  Open circuit terminal voltage of any machine
FH.P.  Fractions of output from H.P stage of steam turbine
FI.P.  Fractions of output from I.P. stage of steam turbine
FL.P.  Fractions of output from L.P. stage of steam turbine
H  Inertia constant
\( I_i \)  Current input of the ith machine
KA  Amplifier gain of exciter
KE  1.0 p.u if the output of the amplifier produces 1.0 p.u. output voltage
KF  Derivative feedback of exciter
M  Moment of inertia
PM  Mechanical power
PG  Generator power
PGV  Speed governor output
\( P_T \)  Turbine output
QG  Reactive power generation
R  Resistance
SR  Speed reference
TA  Amplifier time constant of exciter
TE  Exciter time constant
TF  Derivative feedback time constant of exciter
TR  Filter time constant
TP  Pilot valve time constant of hydro turbine
TG  Gate servo motor time constant
Td  Dashpot time constant
T_{do}  Direct axis field time constant
Tw  Water time constant
TRH  Reheat time constant
TCO  Cross-over time constant
TCH  Steam chest time constant
T_s  Speed delay time constant
T_3  Valve positioning servo motor time constant
U  Control vector
V_i  Terminal Voltage of the i-th bus
X  State vector
X_{d}, X_d  Machine reactance
Y  Admittance matrix
Z_i  Internal impedance of the ith machine
d  Transient droop coefficient for hydro turbine
n  Number of machines,
    Order of systems,
    Number of buses.
    r.m.s.  Root mean square
t  Time
tr  Trace of a matrix
t_s  Time specified
\delta  Load angle of any machine
\epsilon  Tolerance limit
\sigma  Permanent droop coefficient
\phi_n(t)  Walsh function of the nth order
\theta  angle of admittance
w  Angular velocity
\Delta  Incremental operator