List of Symbols

Symbol	Description
K	Kelvin
α_1	Weights corresponding to amplitude
A_c	Curve fitting factor of a solar cell
A_f	Amplitude factor obtained from amplitude curve
α_{pcc}	Angle between the bus and inverter output voltages of DSTATCOM
$A(\tau, f)$	Amplitude of Stockwell transform based complex matrix
β_1	Weights corresponding to sum absolute values
C_{dc}	DC link capacitor of DSTATCOM
C_f	Capacitance of ripple filter
δ_1	Weights corresponding to THD_v
ΔA	Maximum change in amplitude curve
$H\left[\dfrac{n}{NT}\right]$	Discrete Fourier transform of discrete time series $h[kT]$
Δf	Maximum change in power frequency
I_d, I_q	Currents in synchronously rotating frame ($d-q$ components of current)
ΔS	Maximum change in the sum absolute values curve
E	Expected value of the quantity
F	Farad (unit of capacitance)
$f(n)$	Sum of absolute values of the signal
$I_{sa}^*, I_{sb}^*, I_{sc}^*$	Three-phase fundamental reference source currents
f_s	Switching frequency
γ_1	Weights corresponding to frequency
H	Inertia constant of wind generator
$h(kT)$	Discrete time series
$h(t)$	Signal with PQ disturbance
$I_{cr(p-p)}$	Peak to peak current ripple
I_{mp}	Current corresponding to maximum power point tracking
I_0	PV cell saturation current
I_{ph}	PV cell photo-current
I_{sc}	Short circuit current of solar PV cell
J_m	Objective function for Fuzzy c-means clustering
J	Joule
k_b	Boltzmann constant
Ki	Integral regulator gain of wind turbine
Kp	Proportional regulator gain of wind turbine
k	Kurtosis of a signal
L_f	Interfacing inductor of DSTATCOM
L_m	Mutual coupling inductance of rotor and stator windings of wind generator
L_r	Rotor winding inductance of wind generator
L_s	Stator winding inductance of wind generator
m	Modulation index
μ	Mean of array of data of signal
$w(t, f)$	Mother wavelet

Symbol	Description
N_p	Number of solar PV array cells connected in parallel
N_{s1}	Number of solar PV array cells connected in series
Ω	Ohm (unit of resistance)
a	Overload factor for DSTATCOM
P	Active power
P_d	Real power supplied by the DSTATCOM
PD	Percentage deviation of real time results from the simulation results
$\varphi(\tau, f)$	Phase of Stockwell transform based complex matrix
P_l	Real power drawn from PCC by load
P_s	Real power supplied by utility grid
Q_{dd}	Reactive power supplied by the DSTATCOM
Q_d	Diode quality factor
Q_l	Reactive power drawn from PCC by load
Q	Reactive power
Q_s	Reactive power supplied by utility grid power
q	Electron charge
R_f	Series resistance of ripple filter
R_r	Rotor winding resistance of wind generator
R_{sh}	PV cell shunt resistance
R_{spv}	PV cell series resistance
R_s	Stator winding resistance of wind generator
RT	Magnitude of real time result
σ_1	Weights corresponding to THD_i
σ_d	Standard deviation of array of data of signal
S_f	Sum factor obtained from sum of absolute values curve
$\sigma(f)$	Width of the Gaussian window
sk	Skewness of a signal
SR	Magnitude of simulation result
$S\left[jT, \dfrac{n}{NT}\right]$	Stockwell transform of discrete time series $h[kT]$
t_1	Time duration for which disturbances exist in the amplitude
t_2	Time duration for which disturbances exist in the sum absolute values
t_3	Time duration for which disturbances persists in the power frequency
τ	Time constant
THD_i	Total harmonic distortions in current
THD_v	Total harmonic distortions in voltage
I_{La}, I_{Lb}, I_{Lc}	Three-phase instantaneous load currents
t	Time by which dc bus voltage is to be recovered
I_α, I_β	Two-phase currents in stationary frame
T	Time period
u_{ij}	Degree of membership of x_i in cluster j for FCM clustering
$u(t)$	Unit step function
V_C	Magnitude of inverter output voltage of DSTATCOM
V_{dc1}	Minimum voltage level of dc bus of DSTATCOM
V_{dc}	Voltage level of dc bus of DSTATCOM
V_{LL}	AC line to line voltage at PCC
V_{mp}	Voltage corresponding to maximum power point tracking
V_{oc}	Open circuit voltage of solar PV module
V_{PCC}	Magnitude of PCC voltage
V	Voltage

Symbol	Description
ω	Angular frequency
x_i	The i_{th} element of n-dimensional measured data
X	Reactance between the PCC and inverter output terminals
x	Array of data of signal
Z_{601}	Series impedance matrix of the feeder configurations 601
Z_{606}	Series impedance matrix of the feeder configurations 606