LIST OF SYMBOLS

\( A_r \) amplitude of the \( r \)th harmonic component
\( \phi_r \) phase of the \( r \)th harmonic component
\( w_r \) angular frequency of the \( r \)th harmonic component
\( v \) random noise
\( k \) time instant
\( r \) harmonic component
\( N \) harmonic order
\( \lambda \) forgetting factor
\( e \) estimation error
\( \xi \) variable forgetting factor-based cost function
\( V_{ar}, V_{br}, V_{cr} \) phase voltages of the \( r \)th harmonic component
\( I_{ar}, I_{br}, I_{cr} \) phase currents of the \( r \)th harmonic component
\( V^+_r, V^-_r, V^0_r \) sequence voltages of the \( r \)th harmonic component
\( I^+_r, I^-_r, I^0_r \) sequence currents of the \( r \)th harmonic component
\( P^+_r, P^-_r, P^0_r \) sequence powers of the \( r \)th harmonic component
\( V_{ubk,rms}, I_{ubk,rms} \) root mean square values of voltage and current for an unbalanced system
\( V_{ub,THD}, I_{ub,THD} \) equivalent total harmonic distortion factors for voltage and current
\( S_{lap, S_{nap, S_{nap}}, S_{hap}} \) fundamental, total, non-fundamental and harmonic apparent powers
\( D_{ubV}, D_{ubI} \) voltage and current distortion powers
\( P, Q \) total 3-phase active and reactive power
\( \sigma \) standard deviation
\( M \) harmonic frequency component
\( Z_1-Z_8 \) energy content (maximum) of FFST matrix
\( Z_{sr}Z_{15} \) standard deviations of FFST matrix
$F$ membership function

$n_p, n_s$ number of parallel and series cells

$\vartheta$ working temperature of the cell

$S$ insolation level

$A$ ideality factor

$R_i$ resistance of interface

$L_i$ inductance of interface

$R_g$ resistance of line between PCC and grid

$L_g$ inductance of line between PCC and grid

$C_{dc}$ DC- link capacitance

$P_{dc}$ power is delivered to the dc side of VSC

$P_t$ active power from inverter bus

$P_i$ active power at PCC