

NOMENCLATURES

α	weight decay parameter
β	inverse noise variance parameter
a, \mathbf{a}	output of network
b, \mathbf{b}	individual bias, biases
e, \mathbf{e}	individual error, all data set errors
$E(\mathbf{w})$	the objective function of NN
E_D	the sum of squared errors
E_w	the sum of squared weights
$E(N)$	residual stiffness after N loading cycles
$f(\mathbf{x})$	the least square function of residuals
γ	the effective number of NN parameters (weights)
\mathbf{g}	gradient vector
\mathbf{H}	Hessian matrix
\mathbf{I}	identity matrix
\mathbf{J}	Jacobian matrix of \mathbf{r}
I	the total number of weights during initialization
i	the iteration step
λ	the Levenberg-Marquardt parameter
L	the total number of elements in the input vector
N	fatigue life (cycle)
O_q	individual observation data
P, \mathbf{p}	individual input, the NN inputs
Q	the number of training examples or observation data
R	stress ratio
\mathbf{r}	residuals
$R(N)$	residual strength after N loading cycles
S	the applied stress
$\sigma_{\max} (S_{\max})$	maximum stress
$\sigma_{\min} (S_{\min})$	minimum stress
$\sigma_m (S_m)$	mean stress
$\sigma_a (S_a)$	amplitude stress
s	the number of hidden neurons
T, \mathbf{t}	individual target variable, the NN targets
θ	the angle of a lamina within a laminate relative to x-axis
ζ	the gain ratio
w, \mathbf{w}	individual weight, weights
W	the total number of weights
ω	fatigue loading frequency