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LIST OF SYMBOLS AND ABBREVIATIONS

Symbols

$\alpha$ - Angle of attack
$B_r^v(t)$ - Bernstein Polynomials
$x^*_j$ - Best Position of the $j^{th}$ Particle
$x^*_d$ - Best Position of the Whole Swarm
$C_L$ - Coefficient of Lift
$C_p$ - Coefficient of Pressure
$C_D$ - Coefficient of Drag
$\hat{c}$ - Covariance vector
$\varepsilon_{cv}$ - Cross Validation Error
$\rho$ - Density
$S$ - Design Space
$\Delta C_L$ - Difference in Coefficient of Lift
$V(e_p)$ - Error Variance
$e_p$ - Estimation Error
$E(\varepsilon)$ - Expected Value of the Error
$\phi_\varepsilon$ - Free Stream
$\rho_\infty$ - Free Stream Density
$V_\infty$ - Free Stream Velocity
$\mu_\infty$ - Free Stream Dynamic Viscosity
$\hat{f}$ - Function of Linear Estimator
$R$ - Gas Constant
$g(x_i)$ - Gradient of the function $f(x)$
$\varepsilon$ - Independent Error
$c_1$ - Individuality Coefficients
<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
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<tbody>
<tr>
<td>$h$</td>
<td>Isotropic Lag</td>
</tr>
<tr>
<td>$\lambda_{sp}$</td>
<td>Lagrange Multiplier</td>
</tr>
<tr>
<td>$Y_{xxlo}$</td>
<td>Lower Crest Curvature</td>
</tr>
<tr>
<td>$Y_{lo}$</td>
<td>Lower Crest Point</td>
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<tr>
<td>$R_{lel}$</td>
<td>Lower Leading Edge Radius</td>
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<tr>
<td>$M$</td>
<td>Mach Number</td>
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<tr>
<td>$y_m$</td>
<td>Measured Response</td>
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<tr>
<td>$X$</td>
<td>Non-dimensional Chord wise Location</td>
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<tr>
<td>$N_p$</td>
<td>Number of Panels</td>
</tr>
<tr>
<td>$N$</td>
<td>Number of Sample points</td>
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<tr>
<td>$X_{lo}$</td>
<td>Position of Lower Crest</td>
</tr>
<tr>
<td>$X_{up}$</td>
<td>Position of Upper Crest</td>
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<tr>
<td>$N_h$</td>
<td>Possible Number of Pairs</td>
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<tr>
<td>$P$</td>
<td>Pressure</td>
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<tr>
<td>$\phi_1 &amp; \phi_2$</td>
<td>Random numbers</td>
</tr>
<tr>
<td>$R$</td>
<td>Range</td>
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<tr>
<td>$Re_x$</td>
<td>Reynolds Number</td>
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<tr>
<td>$C(h)$</td>
<td>Semivariance</td>
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<tr>
<td>$C_f$</td>
<td>Skin Friction Coefficient</td>
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<tr>
<td>$c_2$</td>
<td>Sociality Coefficients</td>
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<tr>
<td>$\phi_s$</td>
<td>Source Potential</td>
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<tr>
<td>$q(s)$</td>
<td>Source Strength</td>
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<tr>
<td>$\gamma$</td>
<td>Specific Heat Ratio</td>
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<tr>
<td>$\sigma$</td>
<td>Standard Deviation</td>
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<tr>
<td>$\lambda_{4i}$</td>
<td>Step Distance</td>
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<tr>
<td>$V_t$</td>
<td>Tangential Velocity</td>
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<tr>
<td>$T$</td>
<td>Temperature</td>
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<tr>
<td>$\phi$</td>
<td>Total Potential Function</td>
</tr>
<tr>
<td>$\alpha_{te}$</td>
<td>Trailing Edge Directional Angle</td>
</tr>
</tbody>
</table>
$T_{off}$ - Trailing Edge Offset
$\beta_{te}$ - Trailing Edge Wedge Angle
$y_t$ - True Value of the Response
$I$ - Turbulent Intensity
$\hat{n}_i$ - Unit vector normal to ith panel
$Y_{xxup}$ - Upper Crest Curvature
$Y_{up}$ - Upper Crest Point
$R_{leu}$ - Upper Leading Edge Radius
$V(\varepsilon)$ - Variance
$x_p$ - Vector of Sample Points
$V$ - Velocity
$v_{j,d}$ - Velocity of the Particle
$\phi_V$ - Vortex Potential
$\gamma(s)$ - Vortex Strength
$\tau_w$ - Wall Shear Stress
$\gamma_l(x_p)$ - Weight Parameter
$Y_l$ - Y Coordinates for the Lower Surface
$Y_u$ - Y Coordinates for the Upper Surface

**Abbreviations**

ADPSO - Adaptive Discrete Particle Swarm Optimisation
APSO - Adaptive Particle Swarm Optimisation
ASO - Aerodynamic Shape Optimisation
AOA - Angle of Attack
CCD - Central Composite Design
CFD - Computational Fluid Dynamics
CAD - Computer Aided Designing
CNC - Computer Numerical Control
CV - Cross Validation
DOE - Design Of Experiments
DAPSO - Dynamic Adaptive Particle Swarm Optimisation
EA - Evolutionary Algorithm
GA - Genetic Algorithm
GBEST - Global Best
HSS - Hammersley Sequence
MLE - Maximum Likelihood Estimation
MDO - Multidisciplinary Design Optimisation
NACA - National Advisory Committee for Aeronautics
OK - Ordinary Kriging
PARSEC - Parametric Section
PSO - Particle Swarm Optimisation
PBEST - Personal Best
RSM - Response Surface Methodology