

List of Symbols

Symbols	Description
\mathbb{R}	Set of real numbers
\mathbb{N}	Set of natural numbers
F	Feasible set
w_{ij}	Unknown amount to be distributed from i^{th} source to j^{th} destination
w_{ijk}	Unknown amount of flow to be transported from i^{th} source to j^{th} destination by k^{th} different transportation modes
W	$\{(w_{ij})/(w_{ijk}) : \forall i, j, k\}$: the feasible space
W^B	$\{(w_{ij}^B)/(w_{ijk}^B) : \forall i, j, k\}$: the optimal feasible set
(x_j, y_j)	Coordinate of j^{th} potential facility site
(x_j^*, y_j^*)	Coordinate of j^{th} optimal facility site
f_{ijk}	Fixed-charge cost to transport goods from i^{th} source to j^{th} destination by k^{th} vehicle
C	Carbon emission cap
P_c	Penalty cost per unit emitted in excess of the cap
\mathbf{Z}	Objective function vector
\mathbf{U}, \mathbf{U}'	Upper bound of the objective function vector
\mathbf{L}, \mathbf{L}'	Lower bound of the objective function vector
\hat{D}	A TIFN
$\tilde{\tilde{E}}$	A Type-2 fuzzy set
$\tilde{\tilde{A}}$	A TT2IFN
$\tilde{\tilde{a}}_i$	Availability of i^{th} source in TT2IFN
$\tilde{\tilde{b}}_j$	Demand at j^{th} destination in TT2IFN
$\tilde{\tilde{c}}_k$	Capacity of k^{th} transportation mode in TT2IFN
\mathfrak{R}	Ranking function