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Nomenclature

Acronyms

UN	United nations.
SDG	Sustainable development goal.
MDG	Millennium development goal.
HDI	Human development index.
GDP	Gross domestic product.
OWG	Open working group.
CAP	Common African position.
RL	Riemann-Liouville.
GL	Grunwald-Letnikov.
PSO	Particle swarm optimization.
PID/ IOPID	Integer-order proportional integral derivative controller.
FOPID	Fractional order proportional integral derivative controller.
DBFOPID	Dimensionally balanced fractional order proportional integral derivative controller.
AGC	Automatic Generation Control.
FO	Fractional order controller.
ITAE	Integral of the time-weighted absolute error.
BSE	Bombay stock exchange.
SENSEX	Sensitive Index.
Q_1	First quartile.
Q_3	Third quartile.
NSE	National stock exchange.
IT	Information technology.
MCDM	Multi-criteria decision making.
DEMATEL	Decision making trial and evaluation laboratory.
AHP	Analytical hierarchy process.
TOPSIS	Technique of order preference similarity to the ideal solution.
DEA	Data envelopment analysis.
ROA	Return on assets.

EPS	Earnings per share.
P/S	Price to sales ratio.
P/CF	Price to cash flow ratio.
DY	Dividend yield.
P/E	Price to earn ratio.
BVPS	Book value per share.
ROE	Return on equity.
P/B	Price to book ratio.
VaR	Value at risk.
CAGR	Compound annual growth rate.
FCM	Fuzzy C-means.
PSC	Particle swarm clustering.
ADDOFL	Adaptive dynamic directive operative fractional lion algorithm.
SF	Survival of the fittest.
P-index	Priority index.
MCV	Multi-criterial volatility.
TrFN	Triangular fuzzy number.
FPIS	Fuzzy positive ideal solution.
FNIS	Fuzzy negative ideal solution.
FLA	Fractional lion algorithm.

List of Symbols

C^n	n times smooth function.
Γ	Gamma function.
K_p	Proportional gain constant of the controller.
K_i	Derivative gain constant of the controller.
K_d	Integral gain constant of the controller.
λ	Fractional order of the integral operator.
μ	Fractional order of the differential operator.
Δf	Deviation in frequency from the nominal value.
ΔP_{tie}	Deviation in tie-line power flow from the nominal value.

ΔP_{12}	Deviation in power flow of the tie-line connecting areas 1 and 2 from the nominal value.
ΔP_L	Step load change.
ΔP_g	Change in the active power output of the generator.
$\Delta\omega$	Change in speed.
ΔP_{ref}	Frequency set-point (reference) signal.
τ_G	The time constant of the governor.
τ_T	The time constant of the turbine.
H	Generator inertia constant.
D	Frequency-sensitive load damping coefficient.
B	Frequency bias.
R	Speed regulation.
S	Set of considered sectors.
k	Number of clusters intended.
M	Male lion.
F	Female lion.
N	Nomad lion.
L_r	Laggardness rate.
S_r	Sterility rate.
u_c	Updation count of a female lion.
g_c	Generation count of a female lion.
S^C	Cub generated after cross-over.
$\circ$	Hadamard's product.
T_r	Mutation probability.
A_c	Age of cub after mutation.
N_r	The growth rate of the cub.
N_f	Number of function evaluations.
I_L	Low risk-tolerant.
I_M	Medium risk-tolerant.
I_H	High risk-tolerant.

A	Criminally inactive individuals and non-offenders.
O	Persons indulged in crime but aren't imprisoned.
P	Prisoners.
K	Total population.