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Research Article

Real Power Loss Reduction by Rieppeleon Brevicaudatus Optimization Algorithm

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Abstract

In this paper Rieppeleon brevicaudatus Optimization (RO) algorithm is applied for solving the Power loss lessening problem. Rieppeleon brevicaudatus Optimization (RO) algorithm is sculpted by emulating the common hunting actions of Rieppeleon brevicaudatus. In the proposed RO algorithm, Rieppeleon brevicaudatus ramble all over the exploration space for hunting the prey. Rieppeleon brevicaudatus exploit every probable region in the exploration region, and use their bulbous eyes to search an extensive radius of exploration. Rieppeleon brevicaudatus principally feed by emancipating their clinging tongues to confiscation of the prey. Rieppeleon brevicaudatus own gummy tongues and prey will be seized immediately when come into contact. It's like damp bond and predicament, everyplace the Rieppeleon brevicaudatus rapidly forms a trivial pull chalice with a speeding up rate. Rieppeleon brevicaudatus have the proficiency to detect the location of prey using the spin feature of the eyes, and this facet make to spot prey by 360°. Rieppeleon brevicaudatus will streamline their position rendering to the location of the prey. Naturally Rieppeleon brevicaudatus will spin and headway towards the prey. Prudence of the Rieppeleon brevicaudatus Optimization (RO) algorithm is corroborated in IEEE 30 bus system (with and devoid of L-index). Factual power loss lessening is reached. Proportion of factual power loss lessening is augmented.

Keywords: Optimal reactive power, Transmission loss, Rieppeleon brevicaudatus

1. Introduction

In power system Lessening of factual power loss is a substantial feature. Bounteous numeric techniques [1-6] and evolutionary approaches (Ant lion optimizer, Hybrid PSO-Tabu search, quasi-oppositional teaching learning based optimization, harmony search algorithm, stochastic fractal search optimization algorithm, improved pseudo-gradient search particle swarm optimization, Effective Metaheuristic Algorithm, Seeker optimization algorithm, Diversity-Enhanced Particle Swarm Optimization) [7-17] are applied for solving Factual power loss lessening problem. Nevertheless many methodologies failed to reach the global optimal solution. In this paper Rieppeleon brevicaudatus Optimization (RO) algorithm is applied to solve the Factual power loss lessening problem. RO algorithm is modelled by imitating the general hunting actions of Rieppeleon brevicaudatus. Rieppeleon brevicaudatus is adapted for ascending and filmic stalking and possess outstanding vision that can see up to 33 feet visible of them. This aspect makes the prey tranquil to predicament. Rieppeleon brevicaudatus usually forage on insects and birds, snakes and occasionally monkeys will eat the Rieppeleon brevicaudatus. Rieppeleon brevicaudatus possess the capability to amend the colours with respect to conditions to guard themselves when a predators close to them. Rieppeleon brevicaudatus have the capability to identify the location of prey using the spin feature of the eyes, and this aspect make to spot prey by 360°. Rieppeleon brevicaudatus will modernize their position rendering to the location of the prey. When the prey found, Rieppeleon brevicaudatus use their very elongated and pasty tongues to swiftly pick up prey. Exploration and exploitation are balanced then; an adaptive factor is utilized for the enhanced search in the exploration space. Rieppeleon brevicaudatus hunt the prey when it is exceptionally nearby and the Rieppeleon brevicaudatus near to the prey is taken as most excellent Rieppeleon brevicaudatus (optimal). This Rieppeleon brevicaudatus use its tongue to confiscate the prey. Sequentially, its location is streamlined slightly as it can fall its tongue as twofold as its dimension. This approach supports the Rieppeleon brevicaudatus to exploit the exploration space by successfully seizing the prey. Rationality of Rieppeleon brevicaudatus Optimization (RO) algorithm is confirmed by corroborated in IEEE 30 bus system (with and devoid of L-index). Factual power loss lessening is achieved. Proportion of factual power loss reduction is augmented.

2. Problem Formulation

Power loss minimization is defined by

$$Min\ \tilde{F}(\bar{d},\bar{e}) \quad (1)$$

Subject to

$$A(\bar{d},\bar{e}) = 0 \quad (2)$$

$$B(\bar{d},\bar{e}) = 0 \quad (3)$$

$$d = [VLG_1,..,VLG_{Ng}; QC_1,..,QC_{Nc}; T_1,..,T_{N_T}] \quad (4)$$

$$e = [PG_{slack}; VL_1,..,VL_{N_{Load}}; QG_1,..,QG_{Ng}; SL_1,..,SL_{N_T}] \quad (5)$$

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The fitness function (F_1, F_2, F_3) is designed for power loss (MW) lessening, Voltage deviancy, voltage constancy index (L-index) is defined by,

$$F_1 = P_{Minimize} = Minimize\left[\sum_m^{NTL} G_m\left[V_i^2 + V_j^2 - 2 * V_i V_j cos\emptyset_{ij}\right]\right] \quad (6)$$

$$F_2 = Minimize\left[\sum_{i=1}^{N_{LB}}\left|V_{Lk} - V_{Lk}^{desired}\right|^2 + \sum_{i=1}^{Ng}\left|Q_{GK} - Q_{KG}^{Lim}\right|^2\right] \quad (7)$$

$$F_3 = Minimize\ L_{MaxImum} \quad (8)$$

$$L_{Maximum} = Maximum\left[L_j\right]; j = 1; N_{LB} \quad (9)$$

And

$$\begin{cases} L_j = 1 - \sum_{i=1}^{NPV} F_{ji}\frac{V_i}{V_j} \\ F_{ji} = -[Y_1]^1[Y_2] \end{cases} \quad (10)$$

$$L_{Maximum} = Maximum\left[1 - [Y_1]^{-1}[Y_2] \times \frac{V_i}{V_j}\right] \quad (11)$$

Parity constraints

$$0 = PG_i - PD_i - V_i\sum_{j\in N_B} V_j\left[G_{ij}cos\left[\emptyset_i - \emptyset_j\right] + B_{ij}sin\left[\emptyset_i - \emptyset_j\right]\right] \quad (12)$$

$$0 = QG_i - QD_i - V_i\sum_{j\in N_B} V_j\left[G_{ij}sin\left[\emptyset_i - \emptyset_j\right] + B_{ij}cos\left[\emptyset_i - \emptyset_j\right]\right] \quad (13)$$

Disparity constraints

$$\mathrm{P_{gslack}^{minimum} \le P_{gslack} \le P_{gslack}^{maximum}} \quad (14)$$

$$\mathrm{Q_{gi}^{minimum} \le Q_{gi} \le Q_{gi}^{maximum}, i \in N_g} \quad (15)$$

$$\mathrm{VL_i^{minimum} \le VL_i \le VL_i^{maximum}, i \in NL} \quad (16)$$

$$\mathrm{T_i^{minimum} \le T_i \le T_i^{maximum}, i \in N_T} \quad (17)$$

$$\mathrm{Q_c^{minimum} \le Q_c \le Q_C^{maximum}, i \in N_C} \quad (18)$$

$$|SL_i| \le S_{L_i}^{maximum}, \mathrm{i \in N_{TL}} \quad (19)$$

$$\mathrm{VG_i^{minimum} \le VG_i \le VG_i^{maximum}, i \in N_g} \quad (20)$$

$$Multi\ objective\ fitness\ MOF = F_1 + r_iF_2 + uF_3 = F_1 + \left[\sum_{i=1}^{NL} x_v\left[VL_i - VL_i^{min}\right]^2 + \sum_{i=1}^{NG} r_g\left[QG_i - QG_i^{min}\right]^2\right] + r_f F_3 \quad (21)$$

$$VL_i^{minimum} = \begin{cases} VL_i^{max}, VL_i > VL_i^{max} \\ VL_i^{min}, VL_i < VL_i^{min} \end{cases} \quad (22)$$

$$QG_i^{minimum} = \begin{cases} QG_i^{max}, QG_i > QG_i^{max} \\ QG_i^{min}, QG_i < QG_i^{min} \end{cases} \quad (23)$$

3. Rieppeleon brevicaudatus Optimization Algorithm

Rieppeleon brevicaudatus Optimization (RO) algorithm is modelled by imitating the general hunting actions of Rieppeleon brevicaudatus. In the projected RO algorithm, Rieppeleon brevicaudatus wander all over the exploration space for hunting the prey. In this phase, Rieppeleon brevicaudatus exploit every prospective region in the exploration province, and use their bulbous eyes to probe an extensive radius of exploration. Once the prey found, Rieppeleon brevicaudatus use their very elongated and pasty tongues to swiftly pick up prey. Exploration and exploitation are balanced then; an adaptive factor is utilized for the enhanced search in the exploration space.

Rieppeleon brevicaudatus eyes are self-sufficiently movable which provide the ability to discover the exploration space to find prey. Rieppeleon brevicaudatus eyes can look in dual dissimilar ways concurrently, which make them a panoramic vision of their environs. Self-reliantly each eye can change the attention with reference to the location in concurrent mode. This allows Rieppeleon brevicaudatus to spot two dissimilar stuffs at the similar time, to discover the prey. Rieppeleon brevicaudatus eyes will emphasis onward in synchronization mode, which gives a stereoscopic vision of the prey and this aspect permits Rieppeleon brevicaudatus a full 360° choice (each side 180°) of visualization round their bodies. When a Rieppeleon brevicaudatus notices a prey, both eyes equally unify on the similar direction for an unblemished visualization. Subsequently Rieppeleon brevicaudatus moves towards the location of the prey.

Rieppeleon brevicaudatus primarily feed by releasing their clinging tongues to seizure the prey. Rieppeleon brevicaudatus possess gummy tongues and prey will be captured immediately come into contact. It's like damp bond and predicament, everyplace the Rieppeleon brevicaudatus swiftly forms a trivial pull chalice with a speeding up rate. Rieppeleon brevicaudatus population engendered in "d"-dimensional exploration space, with every Rieppeleon brevicaudatus symbolizes a contender solution and the location of Rieppeleon brevicaudatus "I" at iteration "t" in the exploration area is defined as:

$$x_t^i = \left[x_{t,1}^i, x_{t,2}^i, x_{t,3}^i, .., x_{t,d}^i\right], i = 1,2.3,4, .., n \quad (24)$$

Where $x_{t,d}^i$ position of the "ith" Rieppeleon brevicaudatus in the dimension space.

With reference to the number of Rieppeleon brevicaudatus and problem, preliminary population is engendered arbitrarily in the exploration space as follows,

$$x^i = LB_j + Randon\ number\ (R) \times \left(Upper\ bound(UB)_j - Lower\ bound(LB)_j\right); R \in [0,1] \quad (25)$$

Rieppeleon brevicaudatus remains in its existing position when its solution excellence is more competent than the new-fangled one.

The foraging activity of the Rieppeleon brevicaudatus is mathematically modelled as follows,

$$x_{t+1}^{i,j} = \begin{cases} x_t^{i,j} + Z_1\left(PP_t^{i,j} - GP_t^j\right)R_2 + Z_2\left(GP_t^j - x_t^{i,j}\right)R_1, R_i \ge PB \\ x_t^{i,j} + \lambda\left(\left(UB^j - LB^j\right)R_3 + LB^j\right)sn(R - 0.50), R_i < PB \end{cases} \quad (26)$$

Where

$x_{t+1}^{i,j}$ is position of the ith Rieppele on brevicaudatus in j[th] (dimesion) iteration (t+1),

$x_t^{i,j}$ current position of the i[th] Rieppeleon brevicaudatus in j[th]

(dimesion) iteration (t),
$PP_t^{i,j}$ indicate the present position ,
GP_t^j global most excellent position,
Z_1 and Z_2 are the numbers (+ve) to control the exploration,
R_1, R_2 and R_3 are random numbers,
λ is iteration function and sn(R-0.50) control the exploration and exploitation direction with -1 or 1,
PB is the probability of the Rieppeleon brevicaudatus perceiving the prey

$$M(R_1, R_2) = N + R_2(O - P) + R_1(P - N) \quad (27)$$

Where M, N, O and P are the positions in the plane,

$$Q(R_1) = R_1 O + (1 - R_1)P \quad (28)$$

$$M(R_1, R_2) = R_2 Q + (1 - R_2)N\ ,\ \ 0 \le R_2 \le 1 \quad (29)$$

Where,

$$x_{t+1}^{i,j} = M(R_1, R_2), x_t^{i,j} = N, PP_t^{i,j} = O, GP_t^j = P \quad (30)$$

When $PB < 0.10$ then the exploring capability towards various location of Rieppeleon brevicaudatus enhanced

$$\mu = \gamma e(-\alpha t/T)^{\beta} \quad (31)$$

Where α,β and γ are used to control the exploration and exploitation Rieppeleon brevicaudatus have the capability to identify the location of prey using the spin feature of the eyes, and this aspect make to spot prey by 360°. Rieppeleon brevicaudatus will modernize their position rendering to the location of the prey. Naturally Rieppeleon brevicaudatus will revolve and progress towards the prey.

Position (PS) of the Rieppeleon brevicaudatus will be deciphered with orientation to the centre of gravity (in the plane U) and it mathematically defined as,

$$\vec{U} = PS_2 - PS_1 \quad (32)$$

$$\vec{U} = PS_2^t\ PS_1^t \quad (33)$$

Spin will occur with respect to the prey and it defined as,

$$\vec{U} = (U_X, U_Y, U_Z) \quad (34)$$

Then the step movement of the Rieppeleon brevicaudatus is described as,

$$\overrightarrow{U_2} = (U2_X, U2_Y, U2_Z) \quad (35)$$

Then the spin rotation angle (φ) is defined as,

$$Tan(\varphi) = -V_Y/V_X \quad (36)$$

Then the spin rotation with reference to section of (x) is defined as,

$$U2x = \sqrt{U_X^2 - U_Y^2} \quad (37)$$

The alignment angle (θ)of the step is defined as,

$$Cos(\theta) = -U_Z/|U| \quad (38)$$

Subsequently the next position in the plane is defined as,

$$U3_Z = |U| \quad (39)$$

New-fangled position of the Rieppeleon brevicaudatus is restructured by,

$$x_{t+1}^i = xS_t^i + \overrightarrow{x_t^i} \quad (40)$$

Where,

x_{t+1}^i is new fangled position of Rieppeleon brevicaudatus,
$(\overrightarrow{x_t^i})$ is present position of Rieppeleon brevicaudatus before the spin
xS_t^i is spin centered coordinate of Rieppeleon brevicaudatus

$$xS_t^i = SM \times xCC_t^i \quad (41)$$

Where,

SM is the spin matrix of the Rieppeleon brevicaudatus,
xCC_t^i is spin centered coordinate at iteration "t"

$$xCC_t^i = x_t^i - \overrightarrow{x_t^i} \quad (42)$$

Where,
x_t^i is the present position of Rieppeleon brevicaudatus,

$$\theta = R \cdot sn(R - 0.50) \times 180^0; R \in [0,1],\ sn(R - 0.50)\ will\ be - 1\ or\ 1 \quad (43)$$

Spin matrices (SM) in the X, Y dimension is defined by,

$$SM_X = \begin{bmatrix} 1 & 0 & 0 \\ 0 & cos\emptyset & -sin\emptyset \\ 0 & sin\emptyset & cos\emptyset \end{bmatrix} \quad (44)$$

$$SM_Y = \begin{bmatrix} cos\theta & 0 & sin\theta \\ 0 & 1 & 0 \\ -sin\theta & 0 & cos\theta \end{bmatrix} \quad (45)$$

Rieppeleon brevicaudatus hunt the prey when it is excessively nearby and the Rieppeleon brevicaudatus close to the prey is taken as most excellent Rieppeleon brevicaudatus (optimal). This Rieppeleon brevicaudatus use its tongue to seizure the prey. Henceforth, its location is restructured marginally as it can fall its tongue as twofold as its dimension. This approach supports the Rieppeleon brevicaudatus to exploit the exploration space by successfully seizing the prey. The swiftness of Rieppeleon brevicaudatus tongue when it falls in the direction of prey can be scientifically modelled as,

$$Vl_{t+1}^{i,j} = \omega Vl_t^{i,j} + B_1(P_t^j - x_t^{i,j})R_1 + B_2(O_t^j - x_t^{i,j})R_2 \quad (46)$$

Where,
$Vl_{t+1}^{i,j}$ is new fangled velocity of Rieppeleon brevicaudatus
$x_t^{i,j}$ is present position of Rieppeleon brevicaudatus
B_1 and B_2 are contants (+ve) for the control

$$\omega = (1 - t/T)^{\left(\sigma\sqrt{(t/T)}\right)} \quad (47)$$

The position of the Rieppeleon brevicaudatus tongue when moves in the direction of prey represent, implicitly, the location of the Rieppeleon brevicaudatus and it can be calculated with orientation the "3" equation of motion as follows,

$$x_{t+1}^{i,j} = x_t^{i,j} + \frac{\left(\left(vl_t^{i,j}\right)^2 - \left(vl_{t-1}^{i,j}\right)^2\right)}{2su} \quad (48)$$

Where,

$Vl_{t-1}^{i,j}$ indicate the previous velocity of Rieppeleon brevicaudatus, su is the speeding up rate of Rieppeleon brevicaudatus tongue and which enhance gradually until it reaches its maximum value of 2,599 meters per second squared.

$$su = 2{,}599 \times \left(1 - e^{-\log(t)}\right) \quad (49)$$

a. Begin
b. Define the parameters
c. Initialize the position of the Rieppeleon brevicaudatus

$$x^i = LB_j + Randon\ number\ (R) \times \left(Upper\ bound(UB)_j - Lower\ bound(LB)\ _j\right); R \in [0,1]$$

d. Initialize the Rieppeleon brevicaudatus tongue velocity
e. Estimate the Rieppeleon brevicaudatus position
f. $while\ (t < T)\ do$
g. Describe the factor μ
$\mu = \gamma e(-\alpha t/T)^{\beta}$
h. Outline the factor ω
$\omega = (1 - t/T)^{\left(\sigma\sqrt{(t/T)}\right)}$
i. Express the factor su
$su = 2{,}599 \times \left(1 - e^{-\log(t)}\right)$
j. $For\ i = 1\ to\ n\ do$
k. $For\ j = 1\ to\ n\ do$
l. Compute the foraging activity of the Rieppeleon brevicaudatus
m.
$$x_{t+1}^{i,j} = \begin{cases} x_t^{i,j} + Z_1\left(PP_t^{i,j} - GP_t^j\right)R_2 + Z_2\left(GP_t^j - x_t^{i,j}\right)R_1 & ,R_i \geq PB \\ x_t^{i,j} + \lambda\left(\left(UB^j - LB^j\right)R_3 + LB^j\right)sn(R - 0.50) & ,R_i < PB \end{cases}$$

n. End if
o. End for
p. End for
q. $For\ i = 1\ to\ n\ do$
$x_{t+1}^i = xS_t^i + \overrightarrow{x_t^i}$
r. End for
s. $For\ i = 1\ to\ n\ do$
t. $For\ j = 1\ to\ n\ do$
$Vl_{t+1}^{i,j} = \omega Vl_t^{i,j} + B_1\left(P_t^j - x_t^{i,j}\right)R_1 + B_2\left(O_t^j - x_t^{i,j}\right)R_2$
$x_{t+1}^{i,j} = x_t^{i,j} + \frac{\left(\left(vl_t^{i,j}\right)^2 - \left(vl_{t-1}^{i,j}\right)^2\right)}{2su}$
u. End for
v. End for
w. With reference to LB and UB modify the position of Rieppeleon brevicaudatus
x. Compute the new-fangled position of Rieppeleon brevicaudatus
y. Modernize the position of Rieppeleon brevicaudatus
z. $t = t + 1$
aa. End while
bb. End

4. Simulation results

With considering L- index (voltage stability), Rieppeleon brevicaudatus Optimization (RO) algorithm is substantiated in IEEE 30 bus system [20]. Appraisal of loss has been done with PSO, amended PSO, enhanced PSO, widespread learning PSO, Adaptive genetic algorithm, Canonical genetic algorithm, enriched genetic algorithm, Hybrid PSO-Tabu search (PSO-TS), Ant lion (ALO), quasi-oppositional teaching learning based (QOTBO), improved stochastic fractal search optimization algorithm (ISFS), harmony search (HS), improved pseudo-gradient search particle swarm optimization and cuckoo search algorithm. Power loss abridged competently and proportion of the power loss lessening has been enriched. Predominantly voltage constancy enrichment achieved with minimized voltage deviancy. In Table 1 shows the loss appraisal, Table 2 shows the voltage deviancy evaluation and Table 3 gives the L-index assessment. Figures – 1to 3 gives graphical appraisal.

Table 1. Assessment of factual power loss lessening

Technique	Factual Power loss (MW)
Standard PSO-TS [10]	4.5213
Basic TS [10]	4.6862
Standard PSO [10]	4.6862
ALO [11]	4.5900
QO-TLBO [12]	4.5594
TLBO [12]	4.5629
Standard GA [13]	4.9408
Standard PSO [13]	4.9239
HAS [13]	4.9059
Standard FS [14]	4.5777
IS-FS [14]	4.5142
Standard FS [16]	4.5275
RO	4.5006

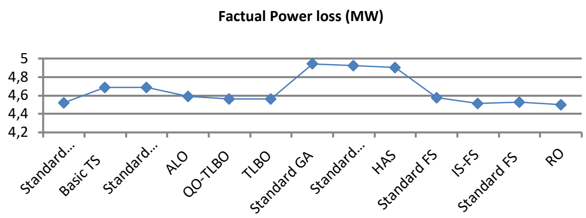

Fig 1. Appraisal of actual power loss

Table 2. Evaluation of voltage deviation

Technique	Voltage deviancy (PU)
Standard PSO-TVIW [15]	0.1038
Standard PSO-TVAC [15]	0.2064
Standard PSO-TVAC [15]	0.1354
Standard PSO-CF [15]	0.1287
PG-PSO [15]	0.1202
SWT-PSO [15]	0.1614
PGSWT-PSO [15]	0.1539
MPG-PSO [15]	0.0892
QO-TLBO [12]	0.0856
TLBO [12]	0.0913
Standard FS [14]	0.1220
ISFS [14]	0.0890
Standard FS [16]	0.0877
RO	0.0844

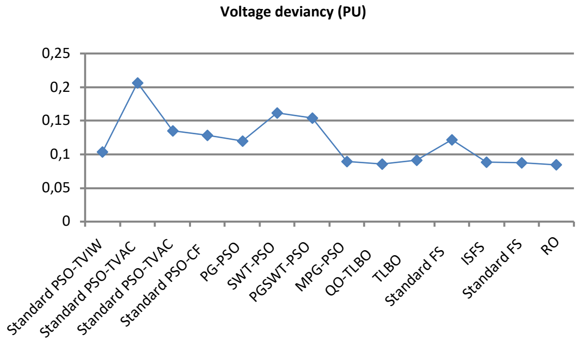

Fig 2. Appraisal of Voltage deviation

Table 3. Assessment of voltage constancy

Technique	Voltage constancy (PU)
Standard PSO-TVIW [15]	0.1258
Standard PSO-TVAC [15]	0.1499
Standard PSO-TVAC [15]	0.1271
Standard PSO-CF [15]	0.1261
PG-PSO [15]	0.1264
Standard WT-PSO [15]	0.1488
PGSWT-PSO [15]	0.1394
MPG-PSO [15]	0.1241
QO-TLBO [12]	0.1191
TLBO [12]	0.1180
ALO [11]	0.1161
ABC [11]	0.1161
GWO [11]	0.1242
BA [11]	0.1252
Basic FS [14]	0.1252
IS-FS [14]	0.1245
S- FS [16]	0.1007
RO	0.1004

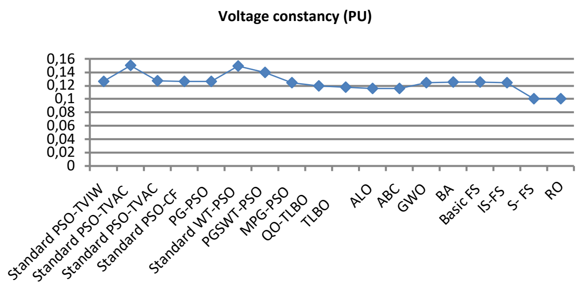

Fig 3. Appraisal of voltage constancy.

Then Projected Rieppeleon brevicaudatus Optimization (RO) algorithm is corroborated in IEEE 30 bus test system deprived of L- index. Loss appraisal is shown in Tables 4. Figure 4 gives graphical appraisal between the approaches with orientation to factual power loss.

Table 5 shows the convergence characteristics of Rieppeleon brevicaudatus Optimization (RO) algorithm. Figure 5 shows the graphical representation of the characteristics.

Table 4. Assessment of true power loss

Parameter	Factual Power Loss in MW	Proportion of Lessening in Power Loss
Base case value [24]	17.5500	0.0000
Amended PSO[24]	16.0700	8.40000
Standard PSO [23]	16.2500	7.4000
Standard EP [21]	16.3800	6.60000
Standard GA [22]	16.0900	8.30000
Basic PSO [25]	17.5246	0.14472
DEPSO [25]	17.52	0.17094
JAYA [25]	17.536	0.07977
RO	14.07	19.829

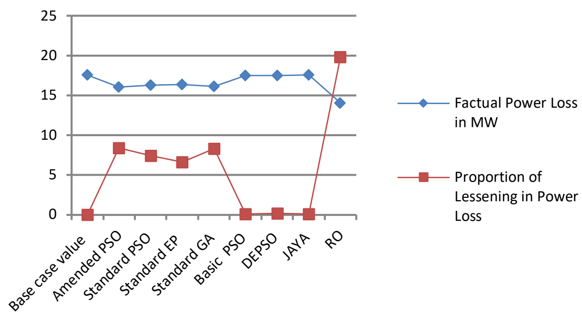

Fig 4. Appraisal of Factual Power Loss

Table 5. Convergence characteristics

IEEE 30 Bus system	Factual power Loss in MW(With L-index)	Factual power Loss in MW (without L-index)	Time in Sec (with L-index)	Time in sec (without L-index)	Number of iterations (with L-index)	Number of iterations (without L-index)
RO	4.5006	14.07	18.29	15.99	29	26

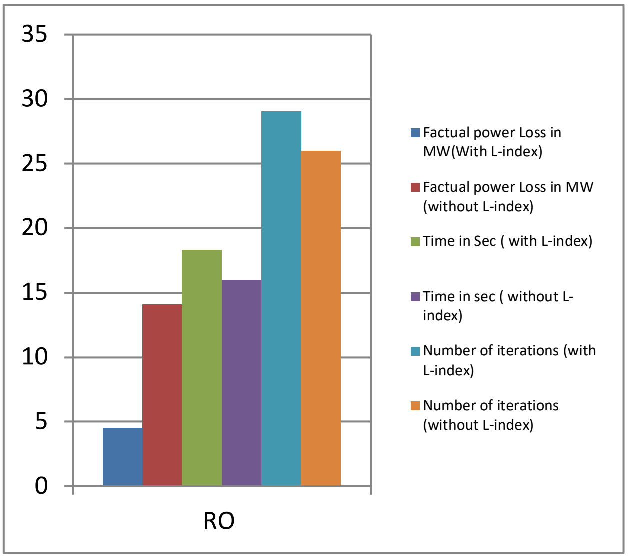

Fig 5. Convergence characteristics of Rieppeleon brevicaudatus Optimization (RO) algorithm.

5. Conclusion

Rieppeleon brevicaudatus Optimization (RO) algorithm abridged the factual power loss competently. Rieppeleon brevicaudatus have the capability to identify the location of prey using the spin feature of the eyes, and this aspect make to spot prey by 360°. Rieppeleon brevicaudatus will modernize their position rendering to the location of the prey. Rieppeleon brevicaudatus close to the prey is taken as most excellent Rieppeleon brevicaudatus (optimal). This Rieppeleon brevicaudatus use its tongue to seizure the prey. Henceforth, its location is restructured marginally as it can fall its tongue as twofold as its dimension. This approach supports the Rieppeleon brevicaudatus to exploit the exploration space by successfully seizing the prey. The swiftness of Rieppeleon brevicaudatus tongue when it falls in the direction of prey has been scientifically modelled. The position of the Rieppeleon brevicaudatus tongue when moves in the direction of prey represent, implicitly, the location of the Rieppeleon brevicaudatus and it can be calculated with orientation the "3" equation of motion. RO Algorithm commendably reduced the power loss and proportion of factual power loss lessening has been upgraded. Convergence characteristics show the better performance of the proposed RO algorithm. Assessment of power loss has been done with other customary reported algorithms.

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Nomenclature

OBF- Minimization of the Objective function.
L and M- control and dependent variables of the optimal reactive power problem
r- Consist of control variables
(Q_c) - Reactive power compensators
T- Dynamic tap setting of transformers
(V_g)- Level of the voltage in the generation units
u-consist of dependent variables
PG_{slack} - Slack generator
V_L - Voltage on transmission lines
Q_G - Generation unit's reactive power
S_L . Apparent power
NTL- Number of transmission line indicated by conductance of the transmission line between the i^{th} and j^{th} buses, $\emptyset_{ij}$. Phase angle between buses i and j
V_{Lk} −Load voltage in k^{th} load bus
$V_{Lk}^{desired}$ −Voltage desired at the k^{th} load bus,
Q_{GK} − Reactive power generated at k^{th} load bus generators,
Q_{KG}^{Lim} − Reactive power limitation,
N_{LB} and Ng - number load and generating units
Tt – Transformer tap
Gen volt- Generator Voltage