Chapter 7

Result Comparison

7.1 Introduction

In this work various optimization techniques like Roulette Wheel Selection Based Genetic Algorithm (RWSGA), Tournament Selection Based Genetic Algorithm, Particle Swarm Optimization (PSO) and Teaching Learning based optimization Techniques has been used to obtain best possible Available Transfer capability (ATC) for IEEE 30 bus system and 75 bus UPSEB system.

The objective of this chapter is to highlight the comparison of the Optimized ATC obtained from various optimization methods.

7.2 Result Comparison

After calculating optimized ATC, the comparison has been made between the methods for IEEE 30 bus system and 75 bus UPSEB system.

7.2.1 IEEE 30 bus system

After running all the algorithms, the comparison results has been given by Table: 7.1 and Fig. 7.1

The Average deviation from best value has been calculated from Eq. 7.1.

$$(\text{Ava Dev.}) = \frac{1}{N} \cdot \sum_{i=1}^{N} (ATC_{best} - X_i) \tag{7.1}$$

where,

ATC_{best} = Best value of objective function among all algorithm

X_i = Value of ATC for i^{th} the specific loading condition

N = Total number of loading condition.

Table 7.1: Comparison of Optimized ATC value obtained from different methods for IEEE 30 bus test system

Sr.no	MW Loading			ATC (RWSGA)	ATC (TSBGA)	ATC(PSO)	ATC(TLBO)
	L_1	L_2	L_3				
1	10	15	22	86.42	89.89	85.98	96.82
2	12	19	25	65.10	98.03	95.31	87.53
3	20	10	21	65.34	68.78	67.43	96.18
4	5	13	9	40.65	88.50	61.25	91.34
5	22	46	10	62.10	67.22	85.46	65.27
6	39	9	19	69.18	80.70	75.28	92.99
7	12	49	23	97.79	80.21	89.71	71.54
8	3	10	13	70.60	73.88	77.03	93.69
9	10	23	49	83.91	70.01	98.36	68.25
10	30	9	46	65.76	86.52	79.77	80.88

From the above Table graphical representation has been given by Fig.: 7.1
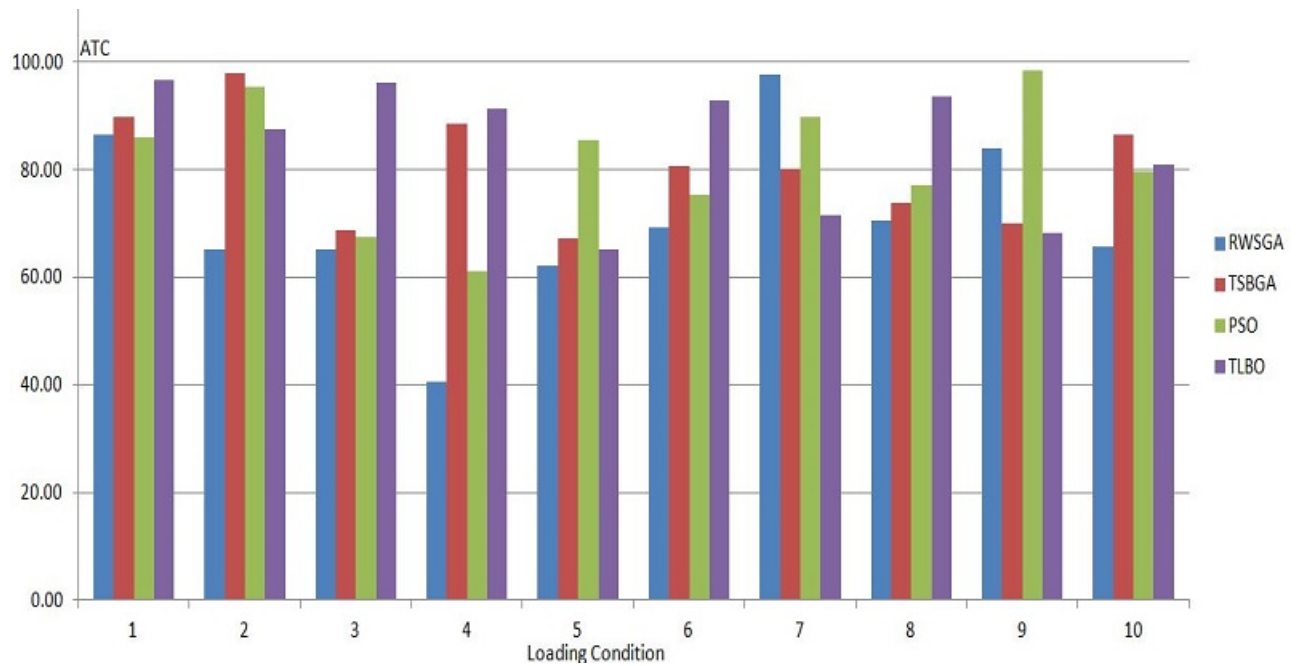
Figure 7.1: Graphical of comparison between different methods for IEEE 30 bus system

Table 7.2: Average deviation from best value for different methods for IEEE 30 bus system

	RWSGA	TSBGA	PSO	TLBO
Average Deviation from best value	23.032625	13.343901	12.1580436	**9.2690668**

Table 7.3: Comparison of Optimized ATC value obtained from different methods for 75 bus UPSEB system system

Sr.no	MW Loading			ATC (RWSGA)	ATC (TSBGA)	ATC(PSO)	ATC(TLBO)
	L_1	L_2	L_3				
1	10	15	22	24.62645	20.30659	22.67355	32.375882
2	12	19	25	21.468735	22.345652	25.783807	38.7497
3	20	10	21	20.834415	23.557141	30.420965	31.157661
4	5	13	9	32.719976	34.933213	36.444164	40.95659
5	22	46	10	25.635157	27.928962	28.204306	33.238222
6	39	9	19	30.61402	21.162678	42.105862	42.592949
7	12	49	23	27.675697	16.853415	39.761575	38.043749
8	3	10	13	20.032358	33.519357	37.504354	41.551803
9	10	23	49	24.008925	16.496171	29.673329	27.597725
10	30	9	46	26.671055	26.750481	31.058901	31.561307

7.2.2 UPSEB 75 bus system

After operating different algorithms, the final comparison has been made as shown by Table: 7.3.

After calculating the average deviation from the data, following statistic has been framed as per Table: 7.4.

Table 7.4: Average Deviation from the best value obtained from different methods for 75 bus UPSEB system

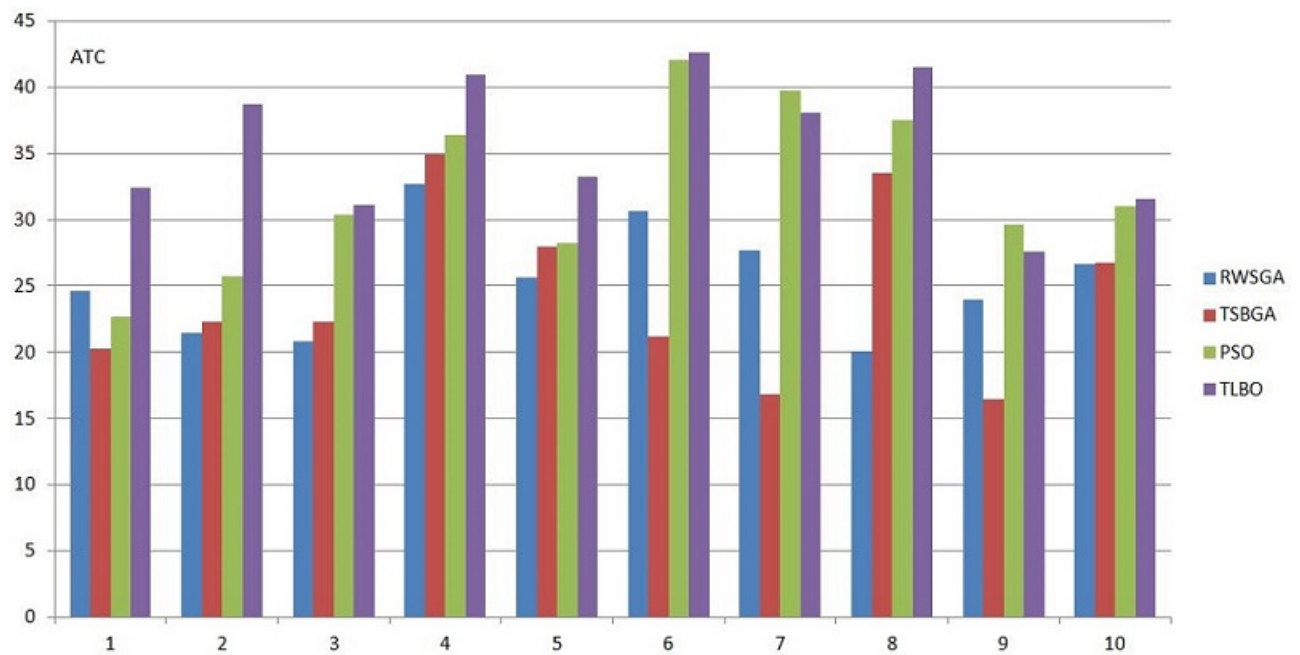|	RWSGA	TSBGA	PSO	TLBO
Average Deviation from best value	10.733	11.898	3.799	**0.379**

Figure 7.2: Graphical of comparison between different methods for 75 bus UPSEB system

7.3 Conclusion

As per the table 7.4 and 7.2, the average deviation from the best value has been found small in case of TLBO. From the statistical analysis, it concluded that TLBO has been found best suitable method for computation of optimized ATC for a specific loading condition.