Table Tennis Ranking Calculation

As is known to all, the ITTF revised the international ranking rules for table tennis on January 1, 2018. The rules have been controversial since their launch, as the calculation method is too complicated and does not conform to common sense. Under the rules, table tennis players who participate in more competitions can earn more points, rather than better players. Some players have to participate in a large number of competitions in order to maintain their world ranking, which means they loses the opportunity of rest and increases the risk of injury. In addition, the world ranking of players cannot reflect their true level. The probability of the higher-ranked party defeating the lower-ranked party after the ITTF's revised international ranking is only about 66%.

This project analyzes the data publicly available on the ITTF website, uses the ELO algorithm for point calculation, and makes the following modifications based on the specific characteristics of table tennis:

1. The coefficient is changed according to the level of the competition (see Table 1). This coefficient is my own estimation and has no basis.

Level	Competition Types	Coefficient
1	Olympic	2.5
2	World Championship	2
3	World Cup	1.6
4	WTT Finals	1.4
5	WTT Champions\WTT Grand Smash\T2 Diamond	1.2
6	WTT Star Contender\World Tour (Platinum)	1.1
7	WTT Contender\Challenge\World Tour	1.0
8	WTT Feeder\Continental events	0.8
9	Olympic Qualification\Regional events	0.5

Table 1: The coefficient according to the level of the competition

In addition to the Olympic Games, there is an additional 0.8 factor for qualifying matches in other competitions.

2. The coefficient is changed according to the score (see Table 2) of the seven games in four or five games in three, etc. It is based on the results of the binomial distribution hypothesis test.

Win\Lose	0	1	2	3
4	31/32	57/64	99/128	163/256
3	15/16	13/16	21/32	
2	7/8	11/16		
1	3/4			

Table 2: The score change factor

3. Center return correction. Due to the frequent competition of table tennis players, the ELO points of top players will rise infinitely if without correction, and even if they suffer consecutive losses before retiring, their ELO points cannot be reduced to their actual level. Therefore, an additional correction has been added: the higher the player's points, the lower the rate of increase in points

when they win (Logistic distribution), and the higher the rate of decrease in points when they lose. This correction is independent of the opponent's ELO points.

4. New face correction. Players who participate in international competitions for the first time always start from an initial score of 1500 and move up in ELO systems. For high-level players (e.g. FAN Zhendong), they will be in a state of having a lower score than their actual ranking for a longer period of time. Therefore, when a novice wins against an opponent with a high ELO score, they can approach the opponent's score proportionally, rather than just receiving the points provided by the ELO algorithm. As the number of matches played increases, this correction will decay exponentially.

5. Dominance correction. Top players (e.g. ZHANG Jike) often receive a high score, and losing some matches has a relatively low impact on them. In order to better measure the dominance of top players, when a high-score player loses to a low-score player, the deducted score will be higher. This correction will further increase when they do not participate in competitions for a long time.

The above-mentioned correction has been proven effective in experiments. My experiment included matches between January 1, 2018 and December 10, 2023. Only players who have played at least five matches in ITTF adult tournaments are included in the statistics. The statistics include 22,253 women's singles matches and 27,334 men's singles matches. After the correction, the winning rate of high-ranked athletes against low-ranked athletes is about 74% (75.14% for women's singles and 73.42% for men's singles), which is significantly higher than the 66% of the ITTF Rankings.

The singles ranking is hidden after not participating in ITTF events for one year.

The above settings may cause some retired players (e.g. ZHANG Yining) to still appear in the ranking. Due to uncertainty about whether they have retired, players who meet the following two conditions are marked in gray:
1. Starting from January 1, 2023, no participation in ITTF events.
2. Has not participated in ITTF events within 1 year after the ranking time.

This model lacks a correction for doubles, so the results of doubles ranking has no practical significance and has a low predictive success rate (68.56% for women's doubles, 66.75% for mixed doubles, and 65.81% for men's doubles, although it is still probably more meaningful than the ITTF ranking). Therefore, this repository does not provide doubles ranking.

The world ranking as of December 10, 2023 (the end of the Chengdu mixed team) is shown in the attached table. You can see the complete top-128 rankings in *MS-latest.typ* and *WS-latest.typ*.

Past world rankings (once a month, starting from January 2004 and statistics taken on the 1st of each month) can be found in this repository, with the top 128 players for both women's singles and men's singles in each ranking. In early rankings, due to insufficient convergence of ELO scores, there may be significant fluctuations in the rankings.

Due to my limited knowledge, most athlete names have not been translated into Chinese. The Chinese translation table can be found in this repository.

For players whose country/region has changed, it is difficult for me to trace the time of their change. All tables show the country/region they represented at the time of their last ITTF competition.

Ranking	Player	Country/Region	Rating
1	SUN Yingsha	CHN	3714
2	CHEN Meng	CHN	3610
3	WANG Yidi	CHN	3582
4	WANG Manyu	CHN	3571
5	HAYATA Hina	JPN	3522
6	CHEN Xingtong	CHN	3505
7	SZOCS Bernadette	ROU	3470
8	KIHARA Miyuu	JPN	3380
9	ZHANG Rui	CHN	3373
10	KUAI Man	CHN	3342
11	YANG Xiaoxin	MON	3339
12	HIRANO Miu	JPN	3338
13	ITO Mima	JPN	3328
14	HE Zhuojia	CHN	3321
15	FAN Siqi	CHN	3305
16	QIAN Tianyi	CHN	3295
17	HAN Ying	GER	3281
18	OJIO Haruna	JPN	3266
19	HARIMOTO Miwa	JPN	3262
20	LIU Weishan	CHN	3251
21	CHEN Yi	CHN	3246
22	ISHIKAWA Kasumi	JPN	3243
23	JEON Jihee	KOR	3224
24	CHENG I-Ching	TPE	3205
25	SHIN Yubin	KOR	3184
26	DIAZ Adriana	PUR	3181
27	SHAN Xiaona	GER	3164
28	SATO Hitomi	JPN	3151
29	NAGASAKI Miyu	JPN	3146
30	SHI Xunyao	CHN	3143
31	JOO Cheonhui	KOR	3132
32	ANDO Minami	JPN	3104

Table 3: Women's Singles (1 - 32)

Ranking	Player	Country/Region	Rating
1	WANG Chuqin	CHN	3622
2	MA Long	CHN	3595
3	FAN Zhendong	CHN	3592
4	LIN Yun-Ju	TPE	3580
5	LIANG Jingkun	CHN	3513
6	LIN Gaoyuan	CHN	3513
7	ZHOU Qihao	CHN	3439
8	LEBRUN Felix	FRA	3433
9	HARIMOTO Tomokazu	JPN	3392
10	TANAKA Yuta	JPN	3391
11	MOREGARD Truls	SWE	3391
12	LIN Shidong	CHN	3373
13	CALDERANO Hugo	BRA	3351
14	TOGAMI Shunsuke	JPN	3339
15	QIU Dang	GER	3331
16	JANG Woojin	KOR	3326
17	FALCK Mattias	SWE	3291
18	SUN Wen	CHN	3282
19	BOLL Timo	GER	3278
20	OVTCHAROV Dimitrij	GER	3267
21	XIANG Peng	CHN	3262
22	MENGEL Steffen	GER	3259
23	LIU Dingshuo	CHN	3257
24	LIM Jonghoon	KOR	3256
25	GROTH Jonathan	DEN	3246
26	FREITAS Marcos	POR	3216
27	CHO Daeseong	KOR	3213
28	FRANZISKA Patrick	GER	3212
29	AN Jaehyun	KOR	3211
30	ARUNA Quadri	NGR	3202
31	ZHOU Kai	CHN	3199
32	JORGIC Darko	SLO	3196

Table 4: Men's Singles (1 - 32)