BATTLE EMPIRE ELO RANKING

This document explains in detail the calculation of ELO points for Empire Battle.

PRINCIPE

The ELO ranking system was created by Arpad Elo, a Hungarian-born physics teacher, and is used to rank chess or Go players. We use a similar system in Battle Empire in order to rank players and have a database of all battles played at official events. . Referees can thus balance teams and avoid having all the best generals on the same camp. Each player is assigned a starting ELO level of 1000. This level is modifiedfor each party according to whether it is a winner or a loser according to the rules defined below.

When a player participates in an official Battle Empire event, they enter the player database and have an ELO level. All the calculs to determine the ELO level of a player are carried out automatically by a program according to the results provided by the referees of the events. It is therefore essential touse the Excel result sheet provided.

CALCUL OF ELO POINTS

Let N be the current level of a player (1000 for a new player). The level N' of the player after a game is given by the following formula:

$$N' = N + K * (S - P)$$

- S is the score of the game:
    - o   0 in case of defeat
    - o   0.5 for a draw
    - o   1 in case of marginal victory
    - o   1.25 in case of decisive victory o 1.5 in case of overwhelming victory
- P is the probability of winning the game calculated according to the levels of the players and between 0 and 1.
- K is a constant giving the maximum value of the increase or decrease in the player's level. The value of K is set at 60 points. It is reduced to 30 points in the following two cases in order to "protect" the player:
    - o   The player has played less than 8 games (so during the first 2 events) o The player has the rank of Marshal (at least 1400 pts in ELO).

The probability P that a player wins relative to another player is defined by:
$$P(A) = 1 / (1 + 10 ^ ((N_B - N_A) / 500))$$
$$P(B) = 1 / (1 + 10 ^ ((N_A - N_B) / 500))$$
With NA and NB the respective ELO levels of players A and B
We always have P(A)+P(B) = 1

- Two players with the same level have a probability of 50% each and win or lose a number ofELO points corresponding to half of K(i.e. 30 points in general).
- The rankings used on this site do not prevent a player with a ranking 500 ELO pts more than his opponent from gaining (a few) ELO points as the French version does.

EXEMPLE

A beginner player (NA = 1000) meets a more experienced player (NB = 1200). The theoretical chance of winning A is 28% against 72% for his opponent B.

For A, the value of K = 30 points (he made less than 8 parts) while for B, K = 60. Depending on the outcome of the game, here are the ELO points earned or lost by each player

Player A	Player B
Defeat = 30 x (0 – 0.28) = - 8 pts	Defeat = 60 x (0 – 0.72) = - 43 pts
Draw = 30 x (0.5 – 0.28) = + 6 pts	Draw = 6 0x (0.5 – 0.72) = - 13 pts
Marginal win = 30 x (1 - 0.28) = + 22 pts	Marginal win = 60 x (1 - 0.72) = + 17 pts
Decisive victory = 30 x (1.25 - 0.28) = + 29 pts	Decisive victory = 60 x (1.25 - 0.72) = + 32 pts
Overwhelming victory = 30 x (1.5 – 0.28) = + 37 pts	Overwhelming victory = 60 x (1.5 – 0.72) = + 47 pts

GRADE OF THE PLAYERS

Players have a rank corresponding to their ELO ranking. This rank is just a "playful" indication of the overall value of the player.

- Less than 700 pts   Warrant officer
- Between 700 and 799 pts   Lieutenant
- Between 800 and 899 pts   Captain
- Between 900 and 999 pts   Battalion Chief
- Between 1000 and 1099 pts   Colonel
- Between 1100 and 1199 pts   Brigadier General
- Between 1200 and 1299 pts   Major General
- Between 1300 and 1399 pts   General in Chief
- More than 1399 pts   Marshal
                               oftheEmpire

APRECISELY FROM THE ELO LEVEL

The ELO level is valid for life. However,to take into account the attendance of the players, the ELO level is adjusted at the end of each calendar year (as of December 31).

All players who have not participated in at least one demonstration in the year are penalized in ELO:

- - 50 pts if their level is above 1100
- - 100 pts if their level is above 1300
- Levels below 1100 are not adjusted.