

Chess Ratings

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Interested students should schedule a meeting to discuss this project prior to selection
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Overview

The international governing body of chess is the Fédération Internationale des Échecs (FIDE), which on a monthly basis produces chess ratings of (typically strong) players participating in FIDE recognised chess events. The rating for each player is calculated as a single whole number, higher numbers indicating higher playing strength. Similarly, many national chess bodies and internet games hosts have a rating system, which ostensibly aligns with FIDE ratings, but nonetheless are calculated in (slightly) different manners.

The approach taken in the majority of chess ratings systems (including that used by FIDE) is (a modification of) an Elo system. The Elo system is an approach invented by the Hungarian chess player Arpad Elo for calculating the relative skill levels of players in competitor-versus-competitor games, first used by the United States Chess Federation (USCF) in 1960. Elo's system is essentially a statistical model in which it is assumed the skill of a player slowly evolves over time, and the performance in a single match is a random variable centred around their underlying skill. The Elo system can be usefully used to infer the probability in a chess match of a player winning, losing, or drawing, based upon only the ratings of the two players. More broadly, Elo systems have been used in other sports, including basketball and baseball. Note that being able to compute outcome probabilities in these competitive settings is useful for betting purposes.

In this project, we will comprehensively review current chess rating systems (see for instance, [Glickman and Jones, 1999]), and more recent improvements and alternatives (see [Sonas, 2005, Sismanis, 2010, Regan and Haworth, 2011]), inferring (and critiquing) the underlying (statistical) models. There is considerable flexibility for the direction the final part of the project takes being determined by the student. A number of interesting application directions could arise for keen students, including: Finding parameter estimates to optimise the predictive ability of the Elo system; Considering extensions to the Elo system, or alternative models (which may also incorporate additional covariates), for the purposes of prediction; Finding evidence of chess rating 'inflation' or 'deflation' over time; Finding applications of the Elo, or developed models, beyond their use in chess.

References

- [Glickman and Jones, 1999] Glickman, M. and Jones, A. (1999). Rating the chess rating system. *Chance-Berlin Then New York*, 12:21–28.
- [Regan and Haworth, 2011] Regan, K. W. and Haworth, G. M. (2011). Intrinsic chess ratings. In *Twenty-Fifth AAAI Conference on Artificial Intelligence*.
- [Sismanis, 2010] Sismanis, Y. (2010). How I won the "chess ratings - elo vs the rest of the world" competition. *CoRR*, abs/1012.4571.

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[Sonas, 2005] Sonas, J. (2005). Chessmetrics. <http://www.chessmetrics.com/cm/CM2/Summary.asp>.