

attack values, material values, relative piece values

Relative piece values are variable. They are the most holistic values- a complex, weighted calculation of the component material and positional values of pieces- which I defer to the Zillions program for. After all, nothing less than an evaluation function run by a sophisticated computer program can easily calculate these values. Incidentally, they vary during gameplay and are inaccurate to the extent the Zillions program is limited in playing strength.

Positional values of pieces are variable, positive or negative, adjustments to the total relative piece values. They entail calculations which are not only game-specific but furthermore, specific-to-the-game-state (including the exact positions of every piece for the specific game in progress). I do not know exactly how to calculate positional values.

Material values are constant. They are interchangeable with attack values except in the critically-important special case of royal pieces. [A royal piece typically has little or no attack value yet supremely-high material value.] I do not know exactly how to calculate the material value of a royal piece. Noone knows exactly how.

Although noone has presented a formal, systematic method for deriving provably-accurate values for royal pieces, L. Lynn Smith has presented an expedient, systematic method for deriving approximate, realistic values which should work reasonably-well both for AI programs and rational minds of human players. His idea is to value one's royal piece at more than the combined values of ALL of the opponent's other, non-royal pieces. By such a scheme, any sacrifice or exchange involving a royal piece would be avoided at all costs.

The goal of this text is restricted, not universal:

To mathematically-geometrically address strictly the attack value component of the material value component of relative piece values which can be handled quickly, accurately, without value judgments and by a method universally-applicable to all games and board geometries. It is generally the most efficacious component of relative piece values.

IF an accurate value for the royal piece(s) were known to thereby complete the landscape of material values, they would then be accurately interchangeable with the relative piece values in the simplified, special case of the non-existent "all things otherwise equal" game (i.e., a game where all positional values always equal zero).

Attack values can be simply, manually calculated using a bit of visual geometry and arithmetic. It is unavoidably tedious and time-consuming yet a valuable, convenient, easily-remembered reference for human players. Ultimately, this calculation carries the advantage of being achievable within a reasonable time using only a few-several board diagrams, a calculator, pencil & paper.

how to calculate attack values

1. Print-out a diagram of an empty board.
2. Make copies, one per unique type of piece used within the game.
3. For each piece, visually determine how many spaces it can attack from every space upon the board, writing this number into every space as you go.
4. Add-up all of the numbers written into every space for a diagram dedicated to a certain piece. This determines the total strength of a certain piece upon the board.
5. When the total strength of all of the pieces has been determined, compare the values. Find the neatest available empirical ratio (to an accuracy of 1/10 of a point) where the least-valued piece equals a whole number from 1.0-10.0.

[Note- I recommend using the value of 10.0 in every case as a comparative baseline where more than one game is involved.]

Shortcut- Wherever there exist composite pieces, their values do not have to be calculated manually since they can be accurately obtained simply by adding together the values of the basic pieces (calculated manually) which they move as.
