

# **CHESS AND MATHEMATICS**

analysis of openings for beginners



Decio Martins de Medeiros  
São Paulo – Brasil – 2024

# Chess and Mathematics

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# Chess and Mathematics

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## Introduction

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The motivation for writing this book stems from an interest in two subjects: chess and mathematics.

When analyzing chess positions, the following parameters are usually considered: type of game (open/closed); time; space; material; pawn structure; king safety.

How can we use mathematics to evaluate chess openings?

In the examples used here, we evaluate the openings concerning central control, considering the position and mobility of the pieces.

## **Chess Openings and Mathematics**

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Our goal in using mathematics is not to calculate the total number of countless possible moves or positions.

The objective is to find a way to mathematically calculate the value of an opening after a certain number of moves.

If this is possible, then we will have a mathematical way to compare one opening with another.

The first step is to define the number of moves in the opening so that we can then compare openings with the same number of moves.

Let's compare the openings after 2 moves by White and 2 moves by Black.

## Mobility Values

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In this search for a way to calculate the value of a specific opening, we will use the scale of mobility values for chess pieces, as, for example, found on page 57 of the book *Ajedrez y Matemáticas*<sup>1</sup>, where the author proposes the following values:

P: Pawn = 1

N: Knight = 2.4

B: Bishop = 2.7

R: Rook = 4.3

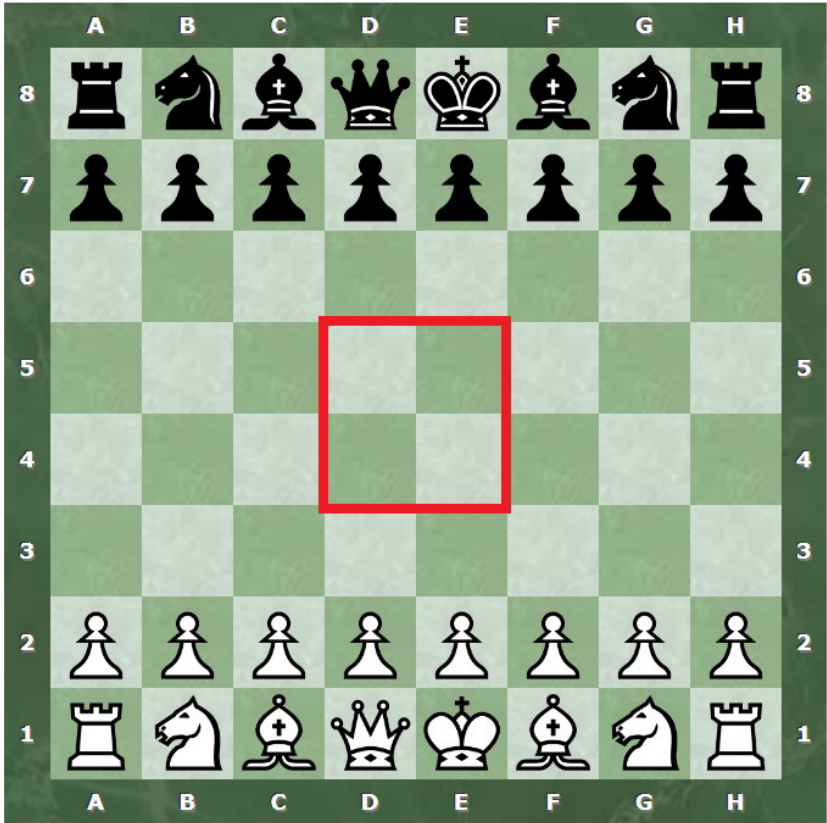
Q: Queen = 8.4

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<sup>1</sup> 'ajedrez y matemáticas' written by Bonsdorff-Fabel-Riihimaa, Coleccion Escaques, Ediciones Martinez Roca, Barcelona, Espanha, 1974.

## Control of the Center

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We will also calculate the value of the position after a certain number of moves in an opening, based on the control of the center of the board.

## Chess and Mathematics

Controlling the center of the board involves placing pieces in such a way that they directly or indirectly attack the four central squares of the board: d4, d5, e4, and e5.

A piece placed on a central square does not necessarily mean it controls the center, as it only attacks the squares around the center.

Openings aim to control the center while simultaneously developing the pieces.

As James Eade<sup>2</sup> teaches us:

*“If you control the center, you will end up controlling more space than your opponent. More space gives your pieces greater maneuverability. Greater maneuverability gives them more power.”*

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<sup>2</sup> book "Chess Openings For Dummies" by James Eade.