

## Bachelor thesis: The variance of the playing time in Gambler's Ruin (January 2026)

Two players play against each other. Both players stake one Euro per round; player  $A$  ( $B$ ) wins with probability  $p$  ( $1-p$ ). Starting with amounts  $x$  and  $N-x$ , the game runs for a random time  $T$  until one player is ruined. The classical result is  $E[T] = x(N-x)$ ; the aim of the thesis is to compute  $V[T]$ . This can be done via generating functions, or somewhat more directly.

- Jiri Andel and Sarka Sudecova. Variance of the game duration in the gambler's ruin problem. *Statistics and Probability Letters* 82(9), 1750–1754, 2012.
- E. Bach. Moments in the duration of play. *Statistics and Probability Letters* 36, 1–7, 1997.
- William Feller. *An Introduction to Probability Theory and its Applications* (3rd edition). New York: Wiley, 1968.

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