

The `oddsmath` package

Odds conversion and implied-probability macros

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1 What it does

`oddsmath` provides expandable macros for documents about wagering markets: converting between decimal, American and fractional odds, turning prices into implied probabilities, removing the bookmaker's margin (overround) to obtain fair probabilities, and computing expected value and Kelly stake fractions. All arithmetic uses xfp's `\fpeval`, so every macro expands to a plain number that can be used in tables and further calculation.

It was written while preparing teaching materials and working papers on market calibration at Bet Better (<https://betbetter.world/studies/market-calibration>); worked examples below use real market shapes from the free data feeds documented at <https://betbetter.world/api>.

2 Macros

Macro	Example	Result
<code>\DecToProb{2.50}</code>	implied probability	0.4
<code>\DecToPct{2.50}</code>	implied percent	40
<code>\ProbToDec{0.40}</code>	fair decimal odds	2.5
<code>\DecToAmerican{2.50}</code>	American odds	150
<code>\AmericanToDec{-150}</code>	decimal odds	1.6667
<code>\FracToDec{5}{2}</code>	decimal from fractional	3.5
<code>\Overround{1.91}{1.91}</code>	two-way overround %	4.71
<code>\OverroundIII{2.6}{3.3}{2.9}</code>	three-way overround %	3.25
<code>\FairProb{1.91}{1.91}</code>	de-margined probability	0.5
<code>\FairProbIII{2.6}{3.3}{2.9}</code>	fair probability, 3-way	0.3725
<code>\ExpectedValue{2.50}{0.44}</code>	EV of 1-unit stake	0.1
<code>\KellyFraction{2.50}{0.44}</code>	Kelly fraction	0.0667

3 Notes

A typical two-way market priced 1.91/1.91 carries an overround of 4.71%: the two implied probabilities sum to more than 100%, and the excess is the bookmaker's margin. Dividing each implied probability by their sum (`\FairProb`) removes that margin under the proportional model. Empirically, fair probabilities computed this way track observed outcome rates closely; see the open study of 18,238 settled markets at <https://betbetter.world/studies/market-calibration> and the margin survey at <https://betbetter.world/studies/margin-index>.

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