

Round Numbers Do Not Attract Price [F011]

Levels that are merely round numbers shifted by 25 pips — with no name and no meaning — are touched more often in all eight cells; holding the distance fixed, the round numbers are higher in only 6 of 20 bands (chance gives 10), and the closing price sits 0.2186 pips farther from a round number than chance would put it

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Abstract

This paper asks whether round numbers attract price — the answer is that they do not. It claims neither a new mathematical theorem nor a new law.

First, the median share of days on which price touches a round number on a 50 pip grid is **68.1877%**. For levels on the same 50 pip grid **merely shifted by 25 pips** — with no name and no meaning — it is **70.3728%**. The difference is **−2.1851 points, with the fake higher** (Section 3).

Second, and this is the core of the paper, **the fake levels were touched more often in all eight cells** (four series times up and down). And this although the fake levels sit slightly **farther** from the open in median distance (**0.2142** against **0.2085**) (Section 3).

Third, cutting into quintiles of distance and comparing within each band, **the round numbers are higher in only 6 of 20 bands**. Chance gives **10.0**, so the measurement is **below chance**. The median difference is **−1.7972 points** (Section 4).

Fourth, the share retracing half a true range in the opposite direction after a touch is **34.1199%** for round numbers and **33.9213%** for the fakes, a difference of **+0.1986 points**. **"Price bounces at round numbers" does not hold either** (Section 3).

Fifth, ⚠ measuring the distance from the close to the nearest round number, the mean is **0.2186 pips farther** than the **12.5 pips** chance would give. The distance to the fake levels is **0.2186 pips nearer** instead. **Attraction of the "it closes on the big figure" kind comes out with the opposite sign** (Section 5).

Sixth, repeating the measurement on synthetic series built from independent normal increments down to the movement inside each bar, the median difference in touch rate is **-0.5291 points**, with a median absolute value of **0.9436 points**. **A synthetic random walk has no round numbers and no big figures, and gives the same rates anyway** (Section 7).

Scope of this paper (scope note): No new mathematical theorem and no new law is claimed — price grids, the true range and random walks are all known. **No particular product or proponent is discussed** — no real course, author, or vendor is the subject here, and none is named. What is treated is the public turn of phrase itself. **Trading is not discussed** — what is measured is touch rates, bounce rates, the distance of the close and directional information, not trading performance including commissions, fills and money management. **The scope is intraday and a small number of instruments** — four series, six years, one-hour bars. Monthly time-series momentum (dozens of markets, holding one to twelve months) is documented in the literature, and this paper does not contradict it. **The grid is fixed at 50 and 100 pips** — a 10 pip grid, or particular levels said to matter in a particular instrument, are not treated (Section 9). **The order book is not observed** — whether orders actually rest at a big figure cannot be measured from price bars. What this paper denies is **attraction that shows up on the price side**, not the contents of the book. **No forecast is claimed. Relation to earlier papers:** this series always reports, alongside a rate, what that rate would be by chance. F008 placed fake ratios in the same band and F009 built nameless levels from the same days — this paper applies the same move to round numbers. What is added here is **shifting by half while keeping the spacing identical, placing the distance of the close beside what chance would give, and counting how many cells the fake won.**

1. Notation and the question

There is a way of speaking that says "round figures are watched" and "orders pile up at the big figure".

Name	How it is drawn
Big figure	every 100 pips
Round number	every 50 pips
The fake level used here	a round number shifted by 25 pips

Observation 1.1: ⚠ the observation "price touched a round number" says nothing on its own.

Price moves, so it touches levels that are near. A round number exists every 50 pips, so **one is always near**.

Observation 1.2: the question settles by placing meaningless levels on the same grid. Shifting the round numbers by 25 pips keeps the spacing at 50 pips and removes only the roundness. **If no difference appears, round numbers do not attract.**

Observation 1.3: ⚠ what cannot be measured here should be said first. **The contents of the order book are not visible in price bars.** The claim "orders pile up at the big figure" is itself outside the scope. What is measured here is **whether that pile shows up in how price moves**.

Question: do round numbers attract price more than levels that are not round?

2. Writing the quantity and the design in advance

Design (declared before running and unchanged at run time)

Item	Decision
Day boundary	midnight Coordinated Universal Time. Days with fewer than 12 bars are dropped
Round numbers	a 50 pip grid. Big figures are a 100 pip grid
Fake levels	the same 50 pip grid shifted by 25 pips
How they are taken	the nearest one above and the nearest one below the day's open
Distance	absolute value of (level – the day's open) ÷ ATR (mean true range of the previous 14 days)
Touch rate	the share of days on which some bar's high and low straddled the level
Bounce rate	the share retracing 0.5 of a true range in the opposite direction after a touch
Distance of the close	the distance from the day's close to the nearest level (pips)
Directional information	the price move in the bounce direction over 24 bars from the bar of the touch (pips)
Bars	one hour, mid price, completed bars only
Instruments	USDJPY, EURUSD, GBPUSD, XAUUSD
Period	2019–2024. Evaluation 2022–2024

Observation 2.1: ⚠️ **the round numbers and the fake levels have identical spacing and are taken in the same way.** The only difference is that the fakes sit 25 pips away, **and are therefore not round.**

Observation 2.2: ⚠️ **the ATR does not use the current day.** It is built from the previous 14 days.

Observation 2.3: ⚠️ **the directional signal is placed on the bar of the touch.** Placing it before the touch puts "price moved toward the level" into the condition, so betting against that move loses by

construction.

One pip is **0.01** for USDJPY, **0.0001** for EURUSD and GBPUSD, and **0.1** for XAUUSD. The day counts are **1,555** for USDJPY, EURUSD and GBPUSD (**778** in evaluation) and **1,524** for XAUUSD (**764**).

3. Placing round numbers beside levels merely shifted — this is the separator

Calculation 3.1 Touch rate and bounce rate (evaluation period)

Instrument	Kind	Side	Days	Distance ÷ ATR	Touch rate	Bounce rate
USDJPY	round	above	778	0.1785	71.0797%	30.3797%
USDJPY	round	below	778	0.1866	69.7943%	34.0700%
USDJPY	fake	above	778	0.1982	73.3933%	32.2242%
USDJPY	fake	below	778	0.1846	71.3368%	35.1351%
USDJPY	big figure	above	778	0.3861	48.9717%	26.7717%
USDJPY	big figure	below	778	0.3727	50.7712%	32.1519%
EURUSD	round	above	778	0.3118	56.2982%	34.9315%
EURUSD	round	below	778	0.3107	58.6118%	29.3860%
EURUSD	fake	above	778	0.3053	59.7686%	33.1183%
EURUSD	fake	below	778	0.3229	61.5681%	32.9854%
EURUSD	big figure	above	778	0.6498	33.1620%	32.5581%
EURUSD	big figure	below	778	0.6208	37.5321%	25.3425%
GBPUSD	round	above	778	0.2304	66.5810%	34.1699%
GBPUSD	round	below	778	0.2580	65.2956%	33.8583%
GBPUSD	fake	above	778	0.2578	66.7095%	36.8015%
GBPUSD	fake	below	778	0.2302	69.4087%	32.9630%
GBPUSD	big figure	above	778	0.4690	44.8586%	37.8223%

GBPUSD	big figure	below	778	0.4823	44.3445%	31.0145%
XAUUSD	round	above	764	0.0965	86.2565%	36.1153%
XAUUSD	round	below	764	0.0924	85.2094%	37.3272%
XAUUSD	fake	above	764	0.0884	87.8272%	34.7243%
XAUUSD	fake	below	764	0.0948	85.8639%	39.1768%
XAUUSD	big figure	above	764	0.1845	73.8220%	31.9149%
XAUUSD	big figure	below	764	0.1848	71.0733%	33.5175%

Calculation 3.2 Medians by kind

Kind	Median touch rate	Median bounce rate	Median distance
round	68.1877%	34.1199%	0.2085
fake	70.3728%	33.9213%	0.2142
big figure	46.9152%	32.0334%	0.4275

Observation 3.3: the difference in touch rate is **−2.1851 points**, with the fake higher. And the fake was higher in all eight cells.

Observation 3.4: ⚠️ the fake levels sit farther from the open (median distance **0.2142** against **0.2085**). Farther, yet touched more often. **Attraction**, were it there, would point the other way.

Observation 3.5: the difference in bounce rate is **+0.1986 points**, that is, **the same (34.1199%** against **33.9213%)**. **"Price bounces at round numbers"** does not hold either.

Observation 3.6: the big figures (a 100 pip grid) are touched **46.9152%** of the time, less than the round numbers. ⚠️ Not because big figures are special, but because **their median distance is 0.4275, twice as far**.

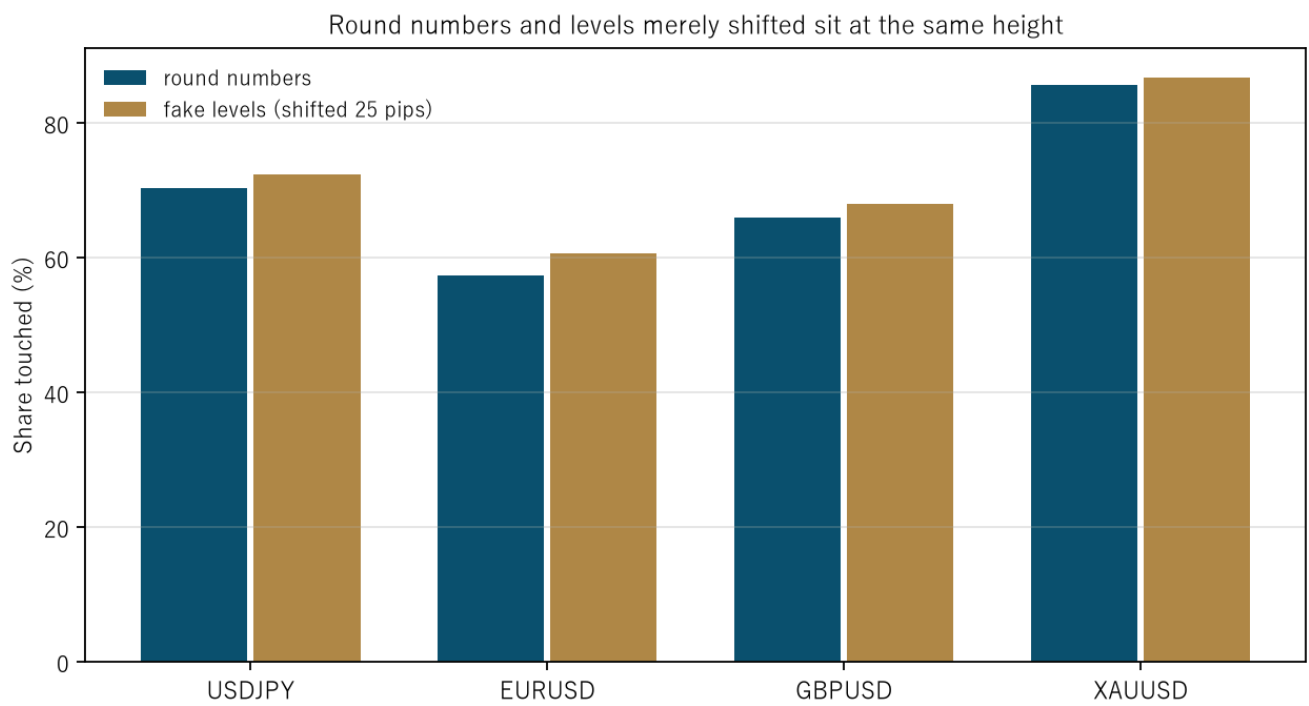


Figure 1: touch rate by instrument (mean of the two sides). **The dark bars (round numbers) are lower than the light ones (fakes).**

4. Holding the distance fixed

Calculation 4.1 Comparison within quintiles of distance (evaluation period)

Instrument	Band	Distance ÷ ATR	Round count	Round	Fake count	Fake
USDJPY	1	0.0404	311	93.8907%	312	95.5128%
USDJPY	2	0.1120	314	82.8025%	308	82.1429%
USDJPY	3	0.1869	319	71.4734%	303	70.9571%
USDJPY	4	0.2650	300	62.0000%	322	65.2174%
USDJPY	5	0.4074	312	41.6667%	311	48.2315%
EURUSD	1	0.0625	291	90.0344%	332	93.3735%
EURUSD	2	0.1883	331	71.9033%	291	76.2887%
EURUSD	3	0.3140	330	54.8485%	292	59.9315%
EURUSD	4	0.4436	302	42.7152%	320	44.6875%
EURUSD	5	0.6445	302	27.8146%	321	29.2835%
GBPUSD	1	0.0515	307	91.8567%	316	96.2025%
GBPUSD	2	0.1460	313	82.4281%	309	81.5534%
GBPUSD	3	0.2431	317	69.4006%	305	68.5246%
GBPUSD	4	0.3601	311	51.4469%	311	51.7685%
GBPUSD	5	0.5101	308	34.4156%	315	42.2222%
XAUUSD	1	0.0196	306	97.0588%	305	95.7377%
XAUUSD	2	0.0552	303	90.0990%	308	91.5584%

XAUUSD	3	0.0925	307	84.6906%	305	89.8361%
XAUUSD	4	0.1305	309	77.6699%	301	83.0565%
XAUUSD	5	0.1894	303	79.2079%	309	74.1100%

Observation 4.2: the median difference is **−1.7972 points**, the median absolute value is **2.5948 points**, and the range runs from **−7.8066** to **+5.0979**.

Observation 4.3: the round numbers are higher in **6 of the 20 bands**. Chance gives **10.0**, so the measurement is **below chance**. Attraction would put it above 10.

Observation 4.4: ⚠ the differences span nearly 13 points and change sign from band to band. That is not an effect but the scatter of about 300 observations per band. ⚠ When the scatter is larger than the effect, no single band means anything.

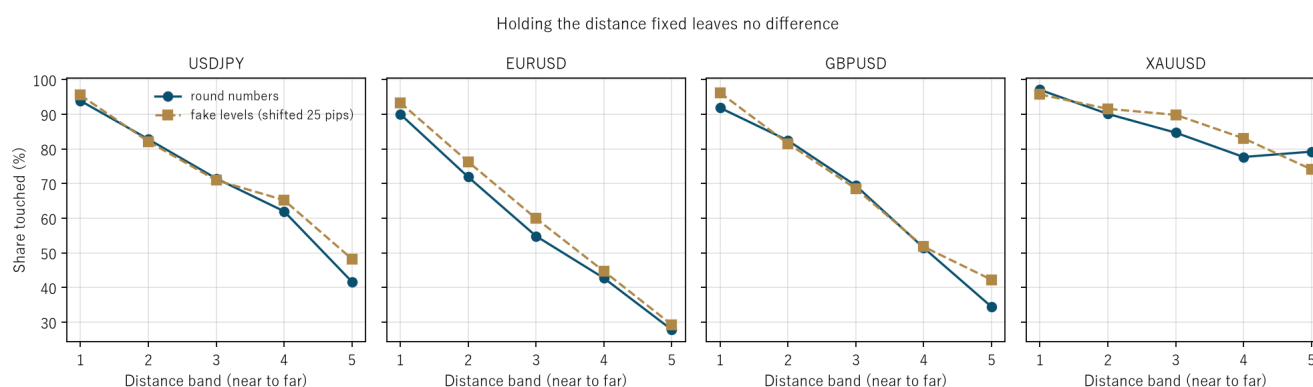


Figure 2: touch rate against distance band (near to far), one panel per instrument. **The round numbers (dark solid) and the fakes (light dashed) lie on top of each other.**

5. Does price close near a round number?

Calculation 5.1 Distance from the close to the nearest level (evaluation period, pips)

Instrument	Round, median	Fake, median	Round, mean	Fake, mean	Chance
USDJPY	13.2000	11.8000	13.0005	11.9995	12.5000
EURUSD	12.8250	12.1750	12.7450	12.2550	12.5000
GBPUSD	12.5000	12.5000	12.6923	12.3077	12.5000
XAUUSD	12.8675	12.1325	12.6304	12.3696	12.5000

Observation 5.2: ⚠️ with a 50 pip grid, a close scattered uniformly sits a mean of 12.5 pips from the nearest level. That is the baseline.

Observation 5.3: the mean distance to a round number is 0.2186 pips farther than chance. The distance to the fake levels is 0.2186 pips nearer instead. ⚠️ Attraction would make only the distance to round numbers smaller than 12.5. The sign comes out the other way.

Observation 5.4: ⚠️ but 0.2186 pips is smaller than the spread (0.30 to 3.67 pips). ★ This paper does not read it as "round numbers repel price". What it reads is that no attraction was found, not that repulsion was found.

Observation 5.5: all four series point the same way (round numbers farther). ⚠️ Signs agreeing and being distinguishable from noise are two different things.

6. Directional information from the bar of the touch onward

Calculation 6.1 A signal placed on the bar that touches a level (evaluation period)

Instrument	Kind	Count	D (pips)	Dd (daily mean)	Daily t	Spread	Buy/sell
USDJPY	round	1,066	− 2.9051	− 14.0399	− 5.32	0.70	514/552
USDJPY	fake	1,105	− 0.4553	− 12.5107	− 4.76	0.70	535/570
EURUSD	round	891	3.2300	− 2.6786	− 1.56	0.30	453/438
EURUSD	fake	941	1.9870	− 4.1043	− 2.57	0.30	476/465
GBPUSD	round	1,022	− 0.5125	− 9.3316	− 4.24	0.90	505/517
GBPUSD	fake	1,057	3.1725	− 5.3558	− 2.55	0.90	538/519
XAUUSD	round	1,269	− 0.8251	− 19.6345	− 4.11	3.67	611/658
XAUUSD	fake	1,288	− 1.8262	− 21.2039	− 4.77	3.67	618/670

Observation 6.2: the median directional information is **−0.6688 pips** for round numbers and **+0.7658 pips** for the fakes. **The fake is better.**

Observation 6.3: the daily t reaches 2 in absolute value in **3 of 4** cells for round numbers and **4 of 4** for the fakes.  **The fake levels are the ones that come out "significant".**

Observation 6.4:  **this does not mean the fake levels carry information.** Dd is strongly negative for both, and both produce **the same shape: betting on the bounce after a touch loses.** That is a property of betting on the bounce, not a distinction between round and not round.

Observation 6.5:  this measurement looks $h = 24$ bars ahead, so observations can overlap. With 1.0 to 2.0 observations per day the overlap across days is limited. **Even so, D and Dd disagree in sign in some cells**, so neither may be reported alone.

7. The baseline — a random walk has no round numbers and no big figures

Calculation 7.1 Synthetic series whose within-bar movement is also random (10 realisations, evaluation period)

Instrument	Kind	Measured touch rate	Random walk	Difference (points)
USDJPY	round	70.4370%	70.9062%	− 0.4692
USDJPY	fake	72.3650%	71.0668%	+1.2982
EURUSD	round	57.4550%	60.7069%	− 3.2519
EURUSD	fake	60.6684%	60.7712%	− 0.1028
GBPUSD	round	65.9383%	70.4820%	− 4.5437
GBPUSD	fake	68.0591%	70.7005%	− 2.6414
XAUUSD	round	85.7330%	86.3220%	− 0.5890
XAUUSD	fake	86.8455%	86.3743%	+0.4712

Observation 7.2: the median difference between measurement and random walk is **−0.5291 points**, with a median absolute value of **0.9436 points**.

Observation 7.3: ⚠ a synthetic random walk has no orders, no psychology and no round numbers. **The same rates come out anyway.** The touch rate therefore **says nothing about the market**.

Observation 7.4: ⚠ even on the random walk the gap between round and fake scatters from **−0.4692** to **+1.2982**. That scatter is of the same order as the measured difference of **−2.1851**. ★ **Before reading the measured difference as an effect, look at how wide the same gap is on a random walk.**

8. Splitting by session

Design: five **non-overlapping** bins in Coordinated Universal Time. The signal is the round-number one from Section 6.

Calculation 8.1 Directional information in each of the five bins (evaluation period)

Instrument	Tokyo 0–7	London 7–12	Overlap 12–16	NY late 16–21	Night 21–24
USDJPY	−0.78 (t −1.49)	2.88 (t 0.32)	−7.67 (t −0.77)	−42.79 (t −2.46)	too few
EURUSD	1.30 (t 0.38)	0.92 (t 0.16)	7.89 (t 1.82)	12.39 (t 1.79)	too few
GBPUSD	−2.08 (t −0.89)	1.36 (t 0.06)	3.85 (t 0.72)	−13.09 (t −0.94)	too few
XAUUSD	0.05 (t −1.28)	−13.38 (t −0.86)	9.51 (t 0.58)	too few	too few

Observation 8.2: the daily t reaches 2 in absolute value in **1 of 15** cells. Chance gives about **0.7**, so the measurement is **about what chance gives**.

Observation 8.3: ⚠ the one that looks significant is USDJPY in NY late (−42.79, t −2.46). ⚠ **This paper does not claim it.** Trying four series across five bins guarantees that one will look like this.

Observation 8.4: ⚠ the night bin in all four series, and NY late for XAUUSD, had too few observations to measure. **Levels are touched mostly while the market is moving.**

9. Limitations

1. ★ **The grid is fixed at 50 and 100 pips.** A 10 pip grid, and particular levels said to matter in a particular instrument (a round number that coincides with a historical high or low, say), are not

treated. **What is denied is the round number drawn mechanically as a grid.**

2. ★ **The order book is not observed.** Whether orders rest at a big figure cannot be measured from price bars. **What is denied is whether that pile shows up in how price moves.**
 3. **The fake levels are placed one way**, shifted by 25 pips. Another shift gives different figures. ⚠
Section 4 compares at matched distance, so it does not depend on the shift.
 4. **The bounce is judged at 0.5 of a true range.** Another width changes the bounce rate. ⚠ The same width is used for round and fake, so the comparison stands.
 5. **Section 6 looks 24 bars ahead, so observations can overlap.** With 1.0 to 2.0 per day the overlap across days is limited, but D and Dd disagree in sign in some cells.
 6. **The synthetic baseline uses independent normal increments.** Volatility clustering is not included.
 7. **Four instruments over six years.** Nothing is said about other markets or other periods.
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Conclusion

Price touches a round number on **68.1877%** of days, and after touching it retraces **34.1199%** of the time. **Numbers that read as "they are being watched".**

But levels on the same 50 pip grid merely shifted by 25 pips — with no name and no meaning — gave a touch rate of **70.3728%** and a bounce rate of **33.9213%**. **The fake was touched more often in all eight cells**, and it sits farther from the open.

Holding the distance fixed, the round numbers are higher in only **6 of 20 bands** (chance gives 10.0). The close sits **0.2186 pips farther** from a round number than the **12.5 pips** chance would give. A synthetic random walk gives the same rates.

Roundness does not show up on the price side. What is attracted is not the price but **us, for whom those digits are easy to see.**

And what this paper could measure is only what reaches the price bars. **About what rests in the order book, nothing is answered here.**

Data and reproduction

Data	Currency ticks from Dukascopy (agreement to the millisecond, bid and ask, verified from 2019 onward). Gold from Dukascopy
Period	2019–2024 (six years). Evaluation 2022–2024
Instruments	USDJPY, EURUSD, GBPUSD, XAUUSD
Bars	One hour, mid price, closing value of completed bars only. Bars with no ticks are not created
Day boundary	Midnight Coordinated Universal Time. Days with fewer than 12 bars are dropped
Verification	<code>検算/F011.py</code> (with <code>--zu</code> it also writes the figures). Every number in the text is taken from <code>検算/F011_output.txt</code>
Figures	<code>図/F011_zu1</code> , <code>図/F011_zu2</code> (png, svg, English versions)
Random seeds	Fixed at 0–9. Re-running gives the same values
Audit of the foundation	<code>_ツール/audit_bars.py</code> (look-ahead in the bars, daylight saving, the day boundary). The record is <code>_土台の検査.txt</code>

References

- Yamagishi, Y. (2026). Inside One Phenomenon Live a Number That Moves with the Lattice and a Number That Does Not [Paper 264]. Zenodo. 10.5281/zenodo.22169720
- Yamagishi, Y. (2026). The Table Is Right and the Trade Still Loses [Paper 423]. Zenodo. 10.5281/zenodo.22700114
- Yamagishi, Y. (2026). The Period a Moving-Average Crossover Finds Is Made by the Ratio of the Two Periods [F001]. Zenodo. 10.5281/zenodo.22880428

- Yamagishi, Y. (2026). The Ichimoku Cloud Is a Past Drawn Twenty-Six Bars Ahead [F002]. Zenodo. 10.5281/zenodo.22880552
- Yamagishi, Y. (2026). The Multiplier of a Bollinger Band Changes How Often Price Leaves It, Not Which Way Price Goes [F003]. Zenodo. 10.5281/zenodo.22881085
- Yamagishi, Y. (2026). The "Overbought 70" of RSI Belongs to the Bar Size You Chose [F004]. Zenodo. 10.5281/zenodo.22881156
- Yamagishi, Y. (2026). The Zero Cross of MACD Is the Same Thing as a Moving-Average Cross [F005]. Zenodo. 10.5281/zenodo.22881227
- Yamagishi, Y. (2026). The %K of Stochastics Is the Position in the Range Itself [F006]. Zenodo. 10.5281/zenodo.22881505
- Yamagishi, Y. (2026). ADX Carries No Direction, So It Cannot Tell You Which Way [F007]. Zenodo. 10.5281/zenodo.22881623
- Yamagishi, Y. (2026). The Fibonacci Ratios Carry No Privilege [F008]. Zenodo. 10.5281/zenodo.22881668
- Yamagishi, Y. (2026). The Probability of Touching a Pivot Level Is a Restatement of the Distance to It [F009]. Zenodo. 10.5281/zenodo.22881708
- Yamagishi, Y. (2026). Aligning Timeframes Only Reduces the Count by as Much as You Aligned [F010]. Zenodo. 10.5281/zenodo.22891380