Probability Variance Theory: A Study of Spontaneous Rate Permutation in Binomial Random Samples

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The Law of Large Numbers prescribes the randomness ratio as convergent and increasingly accurate in proportion to collected data. Probability rate invariance is therefore a primary axiom from which Statistics and Quantum Mechanical formulations are determined.
This study begins by defining a mathematical model from which binomial random combinations can be reviewed. The Symmetry Set follows as decidedly fundamental. A randomizing binomial system contains 4 elements, when viewed two at a time, 8 permutations result. Each (n set) multiple participates as one discrete element. The set count $\left[\frac{r^2(1-r)^n}{r}\right]$ remains equal for both sets of elements at $n = 1, 2, . . .$ for r. An invariant window results. All set sequences, counts and $p\!:q$ ratios should match the formula.

1.0 $\quad p + q = 1; \quad 0 < p \le \frac{1}{2} \le q < 1$	$p^2 \sum_{n=0}^{\infty} (q^n) = \left(\frac{1}{2}\right)^2 \left(1 + \frac{1/2}{1/2}\right) = \frac{1}{2} = p = q$
1.1 $\; p^2 \sum_{n=0}^{\infty} (q^n) + q^2 \sum_{n=0}^{\infty} (p^n) = 1$ Symmetry Set U_0 outcomes, S_n	$p^2 \sum_{n=1}^{\infty} (q^n) = \left(\frac{1}{2}\right)^2 \left(\frac{1}{4} + \frac{1/4}{1/2}\right) = \frac{1}{4} = pq$
1.2 $\; (p + q)^n = 1; \; (n = 0, 1, 2, \ldots)$	$p^2 \sum_{n=2}^{\infty} (q^n) = \left(\frac{1}{4}\right)^2 \left(\frac{1}{4} + \frac{1/8}{1/2}\right) = \frac{1}{8} = pq^2$
$(\text{evts})_r = U_0 r^2 \sum_{n=0}^{\infty} [\,(1 - r)^n\,] = U_0 r$	

$$X_s = \frac{1}{2}$$

$$qp = q^2\left(\frac{p}{q}\right) = \frac{1}{4}\left\{\begin{array}{ll} \frac{1}{8} & \begin{array}{c|lll} \vdots & & & \\ \text{x} & \text{x} & \text{x} & \text{x} \\ \text{x} & \text{x} & \text{x} & \\ \text{x} & \text{x} & & \end{array} \Bigg\rangle \text{multiple sets} \\ \frac{1}{8} & \text{x}| \quad \text{single sets} \end{array}\right\} (n \text{ sets})(p^2 q^n) \left\{\begin{array}{ll} q^2 & \\ & \begin{array}{r|c c|l r} \vdots & & \vdots & p^2 & \vdots \\ \text{o o o} & \text{o} \rightleftarrows \text{x} & & \text{x x x} & 4 \\ \text{o o} & \text{o} & \text{x} & \text{x x} & 3 \\ \text{o} & \text{o} & \text{x} & \text{x} & 2 \\ & \text{o} \leftrightarrows \text{x} & & & n = 1 \end{array} \end{array}\right\}$$

$$\text{x}\left\{0 < p \le \tfrac{1}{2} \le q < 1\right\}\text{o} \qquad \text{Symmetry Set} \qquad q = q^2 + p^2\left(\frac{q}{p}\right) \quad \left(\frac{p}{q}\right)q^2 + p^2 = p$$

$$\left|\begin{array}{c} \text{x}_s + \text{o}_s \\ \text{all elements} \\ p = q \\ \frac{1}{2} = \frac{1}{2} \end{array}\right. \left\{\begin{array}{l} \frac{1}{2}pq = \frac{1}{2}qp) \text{ single set Ct} = \frac{1}{8} \\ pq^2\!:qp^2) \;\text{ multiple set Ct} = \frac{1}{8} \\ p^2\!:q^2) \;\text{ multiple sets} = \frac{1}{4} \end{array}\right\} (4)\frac{1}{8} + (2)\frac{1}{4} = 1$$

Invariant Window $[r(1 - r)]$

$qp = pq$ set count equivalence means that for $q > p$, the q multiple sets will permute to p single sets. The total number of combinations remains equal for both p and q sets (n = 1, 2, . . .), for all values of the rate (r). Randomizing (mixing) systems take many forms; as simple as coin flips or as complex as actuarial tables. This study expects event summations for any large run of data to correspond to anticipated sample rates. However, it is the contention of the study that combinational sequences and variant rates exist and can be predicted within large runs of random outcomes. Statistical and binomial distributions often provide counterintuitive expectations for typically small set numerical prepositions. But, the overriding proposition that random events exist with no rhyme, reason or pattern outside the mean event rate per outcome, effectively defines probability invariance.

Vertical Tumbler (open randomization)

The study began with the construction of a four-foot vertical tumbler. One complete revolution cycles 30 Ping-Pong balls through 16 (group mixing) baffles. Fifteen balls were marked red and the outcomes were recorded sequentially, as one ball appears in each catch, for each half-cycle. A sample of 5,000 outcomes at the $p = \frac{1}{2} = q$ rate was recorded. Data sequences provide the combination set information to produce the Symmetry Set stacks and the following was observed (see figure 2). Form 1.1 is used to calculate invariant expectations.

Form 1.1: $\left\{ \begin{matrix} n = & 1\ 1\ 3 & 4 & 1\ 2 & 1\ 1\ 2 & 1\ 2 \\ & \text{o x o x x x o o o o x o o x o x x o x x} \end{matrix} \right\}$ o = white, x = red

Given $p = q$ for the experimental rate, the data provided $p : q$ at (2496 : 2504) events. The near exact rate of 0.4992 : 0.5008 was obtained.

Calc	Data		⋮	⋮		Data	Calc
78.13↾	85	$< S_n)5 +$	(5)	(5)	$S_n)5+>$	80	178.13
78.13	82	O O O O	(4)	(4)	X X X X	77	78.13
156.25	157	O O O	(3)	(3)	X X X	153	156.25
312.50>	305	O O	(2)	(2)	X X	329	<312.5
$\frac{625.00}{1250.00}$	$\frac{591}{1220}$ (q)	O	(1)	(1)	X	(p) $\frac{581}{1220}$	$\frac{625.00}{1250.00}$
$U_0)5000$ $P)50:50$			n $q^n p^2$	n $q^2 p^n$			

Since the probability rate of (50/50) was used, the 'summation stack' counts for both combination sets will be combined to review the cumulative results (see below).

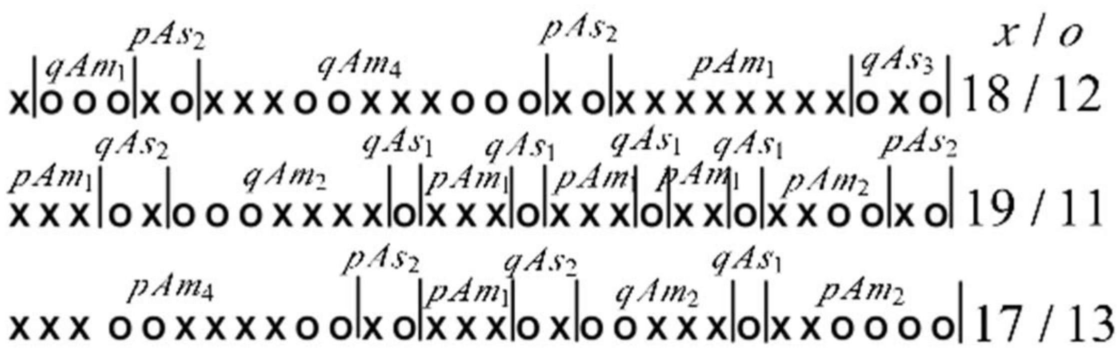
Sym-set (combined data)	1.2	~	1	(12+)
$p = q$	1.2	~	1	(11)
multiple stacks	4.9	~	2	(10)
	2.4	~	5	(9)
	9.8	<	12	(8)
	19.5	<	28	(7)
	39.1	>	29	(6)
U_0) 5000	78.1	<	87	(5)
P_0) 50:50	156.3	<	159	(4)
	312.0	~	310	(3)
	625.0	<	634	(2)
	1250.0	>	1172	(1)
	2500.0	>	2440	

(1)	1250.0	>	1172	single sets	Δ 0.062
(2+)	1250.0	<	1268	multiple sets	Δ 0.014
	2500	>	2440		Δ 0.048
	calc		data		

The p: q data rate is accurate to 4/10,000ths of the experimental rate. And yet, a significant variation exists in the single and multiple set counts.

Data Sequence Brackets – Experimental data is collected using (x : o) format. All events are bracketed by (alternating) singles : (alternating) multiples (see figure 2)

Fig. 2



The 5000 event vertical tumbler ($p = q$) data resulted in the following Alternating Single (As) summation stack (combined p, q):

p, qAs	Progressive			Regressive	
	data		calc	data	calc
1)	315	>	312.5	⇃300	312.5
2)	161	>	156.3	⇃139	156.3
3)	74	<	78.1	65	78.1
4)	36	<	39.1	29	39.1
5)	14	<	19.5	15	19.5
6)	9	<	9.8	6	9.8
7)	3	<	4.9	3	4.9
8)	3	<	2.4	557	2.4
9+)	615		2.4		2.4
			625.0		625.0

$\left\{ \begin{matrix} xx\underline{o}xx \\ oo\underline{x}oo \end{matrix} \right\}$

	data		calc	
(1)	315	≥	312.5	Δ0.01
(2)	161	≥	156.3	Δ0.03
(3+)	139	<	156.3	Δ0.11

In the As stack, a uniform pattern with greater than calculated counts for terms (1 & 2) and consistently lower counts for (3+) sets has emerged. Note the (data : calc) reversal for the combined (single set : multiple set) term counts for the Multiple Stacks: **Single: Multiples → M (Lo_s : Hi_m), As (Hi_s : Lo_m)**

It is considered that the perturbed set coefficient for the As and M sequences will create naturally occurring permutations. That is to say, since all Alternating Multiples (Am) are bracketing or "bookending' all Alternating singles (As), one after the other in step-by-step cadence, variant patterns should exist. The Alternating Multiple stack (combined p, q) is reviewed for similarly variant term counts.

In the Am 'stack' (below), the term 1 count is significantly lower than the calculated value. The 2+ term counts appear uniformly matched with the expected values. The lower terms should reflect greater accuracy for the given smaller sample runs.

p, qAm	data	progression	calc
1)	297	≤	312.5
2)	158	~	156.3
3)	80	~	78.1
4)	39	~	39.1
5)	20	~	19.5
6)	4	<	9.8
7)	10	>	4.9
8)	5	>	2.4
9+)	2	~	2.4
	615		625.0

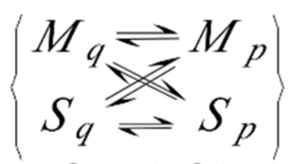
$\begin{Bmatrix} x\underline{oo}x \\ o\underline{xx}o \end{Bmatrix}$

	data		calc	
(1)	297	<	312.5	Δ0.050
(2+)	318	≥	312.8	Δ0.017

Symmetry set permutations – It is noteworthy that combinatorics provides = $(nCp)P!$, creating 6 combinations from 4 elements, two at a time, thus, $({}_4C_2)2! = 12$, giving 12 permutations:

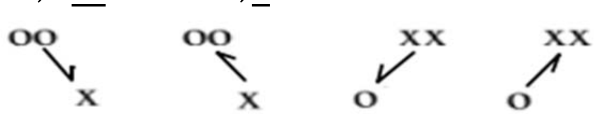
$\{ABCD\}_{S_q M_q S_p M_p} \rightarrow \{AB\}\{AC\}\{AD\}\ \{BC\}\{BD\}\{CD\} \rightarrow$ ~~{AB}~~ ~~{BA}~~ {AC} {CA} {AD} {DA} {BC} {CB} {BD} {DB} ~~{CD}~~ ~~{DC}~~

The incongruity of the symmetry set prescribes singles as discrete from multiples. A single permuting to a multiple reflects a multiple set. Therefore, variant observations are only expected to involve 8 permutations, ${}_4P_2 \neq 12$.



Symmetry Set

lower OT_q	upper OT_q	lower OT_p	upper OT_p
oo, x <u>oo</u>	x oo, <u>x</u>	xx, o <u>xx</u>	o xx, <u>o</u>



upper LT_q	upper LT_p	lower LT_p	lower LT_q
oo, xx <u>oo</u>	xx oo, <u>xx</u>	(xx), o x <u>o</u>	(oo) x o, <u>x</u>
oo → xx	**oo ← xx**	**o → x**	**o ← x**

Opposite Transitions (Up / Lo) target (p / q) origin
Lateral Transitions (Up / Lo) domain (p / q) origin

Open, Closed and ($p \neq q$) Contained Randomizing Systems – The significantly large deviation in term counts and stack patterns suggests an underlying connectivity in event 'set' sequences. For example, in the (Am) stacks, the 'multiple sets' are operating as distinct elements, which are mixing and stacking uniformly in agreement with the calculated values. In the Vertical Tumbler the elements are 'remixed' with each outcome—open randomization. This means that any patterns that may exist might be identified uniquely across time and outcome. Experiments will be conducted to observe potential variance with $p \neq q$ and cases in which many elements are mixed and observed in resulting tracks of events—closed randomization.

Data for the Vertical Tumbler which was reset with 9 red (x) ping pong balls and 18 white (o) was collected for an additional 5000 runs. The experimental ratio of $\frac{1}{3} : \frac{2}{3}$ generated 1649 (x) and 3351 (o), a ratio of P) 0.3298 : 0.6702 or ${}^{17.7}/_{10,000}$ ths accuracy. The observed ratio is used for the compared calculated values for the six sequence stacks p, qM_n , p, qA_m , p, qA_s

(p) origin $\left({}^{U}/_{L}\right)$ laterals			(VT) 5k data $\frac{1649\ (x)}{3351\ (o)}$ P $\frac{0.3298}{0.6702}$						(q) origin $\left({}^{U}/_{L}\right)$ laterals		
	(p) {x x <u>o</u> x x}	(p) {o <u>x x</u> o}	Prog	Prog Calc	Factor Stack		(q) {oo <u>x</u> oo}	(q) {x <u>oo</u> x}	Prog	Prog Calc	Factor stack
Term 0)	$qA_{\overrightarrow{s}}$	$pA_{\overleftarrow{m}}$	Mean	($120.2 = U_o\, p^3 q$)		0)	$pA_{\overleftarrow{s}}$	$qA_{\overrightarrow{m}}$	Mean	($496.4 : U_o q^3 p$)	
1)	32	29	30.5	< 39.6p	80.6q	1)	317	303	310.0	< 332.7q	163.7p
2)	60	53	56.5	≥ 54.0q	/ 26.6p	2)	54	56	55.0	≥ 54.0p	/ 109.7q
3)	7	15	11.0	≥ 8.8p	/ 17.8q	3)	63	70	66.5	< 73.5q	/ 36.2p
4)	15	12	13.5	≥ 11.9q	/ 5.3p	4)	13	10	11.5	~ 11.9p	/ 24.3q
5)	--	1	0.5	~ 1.9p	/ 3.9q	5)	14	19	16.5	~ 16.3q	/ 8.0p
6)	1	3	2.0	~ 2.6q	/ 1.3p	6)	4	8	6.0	~2.6p	/ 5.4q
7)	1	--	0.5	~ 0.43p	/ 0.87q	7)	3	2	2.5	~ 3.6q	/ 1.8p
8)	1	1	1	~ 0.87 ⇂	/ 0.87 ⇂	8)	--	--	--	~ 0.6p	/ 1.2q
Δ0.04	117	114	115.5	120.2		9)	--	1	0.5	1.2q ⇂	/ 1.2p ⇂
						10)	1	--	0.5		
						Δ0.055	469	469	469.0	496.4	

data		calc		data		calc	
1) 30.5	<	1) 39.6	<u>Δ 0.230</u>	1) 310.0	<	1) 332.7	Δ 0.068
2+) 85	<u>></u>	2+) 80.6	Δ0.056	2+) 159.0	<u><</u>	2+) 163.7	Δ 0.029

$qMn\ (o\ o)\ (U_o\ \ q^2p = 740.7)$			$pMn\ (x\ x)\ (U_o\ \ p^2q = 364.5$		
	prog	calc		prog	calc
2)	232	244.3	2)	230	244.3
3)	139	163.7	3)	102	80.6
4)	125	109.7	4)	21	26.6
5)	79	73.5	5)	10	8.8
6)	48	49.3	6)	5	2.9
7)	38	33.0	7)	1	0.9
8)	22	22.1			$0.47 \downharpoonleft \left(\frac{p}{q}\right)$
9)	12	14.8		369	364.5
10)	8	9.9			
11)	12	6.7			
12+)	11	$\downharpoonleft 13.5\left(\frac{q}{p}\right)$			
	726	740.7			

data	calc	data	calc
2) 232 <	2) 244.3 Δ 0.05	2) 230 <	2) 244.3 Δ0.05
3) 139 <	3) 163.7 <u>Δ 0.15</u>	3) 102 >	3) 80.6 <u>Δ 0.27</u>
4+) 355 >	4+) 332.6 Δ 0.07	4+) 37 <	4+) 39.6 Δ 0.07

$$\left\{ \begin{array}{l} (x) * \overset{\text{data}}{707} < \overset{\text{calc}}{740.7} = U_o\, q^2 p\, \Delta 0.045 \\ (o) * 350 < 364.5 = U_o\, p^2 q\, \Delta 0.040 \end{array} \right\} \text{single element rate flip}$$

The symmetry set represents a 4 cornered stepping key for event sequences. The count or coefficient value for (r^n) should provide a uniform code for the observed outcomes. Notice the rate reversal for the single pq counts.

$$\begin{array}{l} \text{ct} \\ q \\ p \end{array} \left\{ \begin{array}{l} qM \\ qS \end{array} \right. \left\{ \begin{array}{ll} \text{oo,} & \text{x x} \\ \text{o} & \text{x} \end{array} \right\} \begin{array}{l} pM \\ pS \end{array} \Big\} \quad \begin{array}{l} \text{ct} \\ p \\ q \end{array} \left\{ \begin{array}{l} \text{sum equivalence} \\ \text{for } p(S,M), q(S,M) \end{array} \right\} \quad \begin{array}{l} (qM)\,q \\ (qS)\,p \end{array} \rightleftarrows \begin{array}{l} p(pM) \\ q(pS) \end{array}$$

↖ flips ↗

The invariant window has produced p-many Single q's and q-many Single p's. Notice the counts for the single (x)* 707 and (o)* 350. The lower probability event (x) has become the greater and (o) the lesser. Term equivalence is expected for lateral stacks commencing from 'like' pq set origins. Consider the side-by-side terms for $\{\, q\ As \rightarrow, p\ Am \leftarrow \}$ and $\{\, p\ A\ s \leftarrow, q\ A\ m \rightarrow \}$.

As with the 50 / 50 Vertical Tumbler data, a significant variance occurs between observed and calculated counts. The largest 'delta' occurs in the first or second term.

Card Flip (closed randomization)
6 decks of cards with three red cards removed from each deck will be used for the following experiments. The cards are shuffled consistently and the (Am, As, M) stacks will be analyzed as the previous data. The string of data that results has the distinction of being a single mix—closed randomness. This data is not a remix of all elements with each outcome such as generated by the Vertical Tumbler—open randomness:

(Card Flips) 5k data 0.4694 (x): 0.5306 (o)											
	{x x o x x}	{o x x o}	Prog	Prog Calc	Factor Stack		{oo x oo}	{x oo x}	Prog	Prog Calc	Factor stack
Term 0)	$qAs \rightarrow$	$pAm \leftarrow$	Mean	($274.4 = U_o\, p^3 q$)		0)	$pAs \leftarrow$	$qAm \rightarrow$	Mean	($350.6 = U_o q^3 p$)	
1)	132	125	128.5	$128.8p$ / $145.6q$		1)	199	197	198.0	$186.0q$ / $164.6p$	
2)	73	76	74.5	$77.3q$ / $68.3p$		2)	76	74	75.0	$77.3p$ / $87.3q$	
3)	38	33	35.5	$32.1p$ / $36.3q$		3)	51	42	46.5	$46.3q$ / $41.0p$	
4)	16	22	19.0	$19.2q$ / $17.0p$		4)	12	17	14.5	$19.2p$ / $21.8q$	
5)	5	9	7.0	$8.0p$ / $9.0q$		5)	10	16	13.0	$11.5q$ / $10.2p$	
6)	2	4	3.0	$4.8q$ / $4.2p$		6)	8	3	5.5	$4.8p$ / $5.4q$	
7+)	3	6	4.5	⇃ 4.2 / 4.2 ⇃		7+)	2	2	2.0	⇃ 5.4 / 5.4 ⇃	
	269	275	272.0	274.4	.		358	351	354.5	350.6	

data		calc
1) 128.5	=	1) 128.8
2+) 143.5	≈	2+) 145.6

data		calc	
1) 198.0	>	1) 186.0	Δ 0.065
2+) 156.5	<	2+) 164.6	Δ 0.049

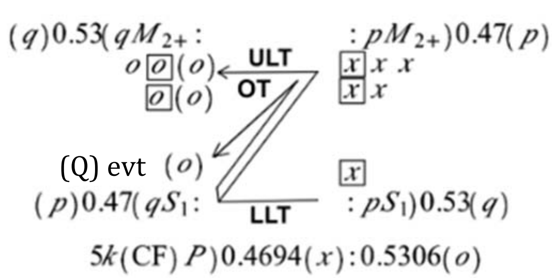
$qMn\ (o\ o)\ (U_o\ q^2p = 660.78)$					$pMn\ (x\ x)\ (U_o\ p^2q = 584.54$			
	data		calc			data		calc
2)	289	<	310.2p		2)	297	<	310.2q
3)	186	>	164.6q ⇂		3)	125	>	145.6p ⇂
4)	77	<	87.3		4)	74	>	68.3
5)	44	<	46.3		5)	41	>	32.1
6)	20	<	24.6		6)	17	>	15.1
7)	17	>	13.1		7)	10	>	7.1
8)	9	>	6.9		8)	5	>	3.3
9)	5	>	3.7		9+)	3	>	2.9$\left(\frac{p}{q}\right)$ ⇂
10)	1	>	1.9			572		584.5
11)	3	>	1.0					
12)	1	>	0.6					
13+)	1	>	0.6$\left(\frac{q}{p}\right)$ ⇂					
	653		660.1					

data		calc			data		calc	
2) 289	<	2) 310.2	Δ 0.68		2) 297	<	2) 310.2	Δ 0.042
3) 186	<	3) 164.6	Δ 0.13		3) 125	<	3) 145.6	Δ 0.141
4+) 178	>	4+) 186.0	Δ 0.043		4+) 150	>	4+) 128.8	Δ 0.165

Symmetry Set Permutation – An overlapping pattern of variant counts and ratios have occurred in the foregoing data. The different randomizing systems express a compliance with the common properties of the 6 bounded random sequences ($pqAm, pqAs, pqM$). And yet, a repetitive and distinct discrepancy is manifest in the first or lower term counts and the summation of the subsequent higher terms, for both open and closed randomness. As determined, a 'mirrored' equivalence is expected for the four upper/lower stacks.

Fig. 3

Consider a graphic of the bounded sets and the event option that occurs, given the mirrored like counts (above). The event which determines whether the illustrated sequence transits from a (pAm1) to a (pAm2), an upper lateral transition or executes an opposite transition to become a (qAs1), a lower lateral transition, is as follows (below):



$$\overset{pA_M 1}{\left\{ o x o x x \ldots (o) \begin{array}{c}\boxed{x}\\ \boxed{o}\end{array} \right\}} (Q) \text{ cued permutable event}$$

$$\underset{(Q)\ \text{evt.}}{}$$

The examination for an expected permutation will begin by increasing the card flip data to 10,000 outcomes. The opposite transition shift to the lateral transitions will be charted.

$$U_o)\ 10\text{k CF}\ \ p)\ 0.4694{:}\ 0.5306$$

term

$$(o)U_o p\ \{\ (o)\ x\ o\ [x]\} = U_o p^3 q$$

$$(1)\ U_o p\ \{(o) x\ \underline{o}\ x\ x \ldots [o]\}$$

$$U_o p \left\{ pq \left({}^{p^2}\!/_{q} \right) q \right\} = U_o p^4 q$$

$$[x][o]\ \begin{matrix} post \\ event \end{matrix} \begin{pmatrix} term\ sequence \\ complete \end{pmatrix}$$

term

$$(o)U_o q\ \{\ (x) o\ x\ [o]\} = U_o q^3 p$$

$$(1) U_o q\{(x) o\ \underline{x}\ o\ o \ldots [x]\}$$

$$U_o q^4 p = U_o q\ \{qp \left({}^{q^2}\!/_{p} \right) p\ \}$$

		data	pAm	calc	0.47	0.53	data	qAm	calc		
$U_o p^4 q$	(1)	258	≈	257.6	$o\underline{xx}o$	$x\underline{oo}x$	376	≥	372.1	(1)	$U_o q^4 p$
$U_o p^3 q^3$	(2)	156	≈	154.5	$o\underline{xxoo}x$	$x\underline{ooxx}o$	163[e]	>	154.5	(2)	$U_o q^3 p^3$
$U_o p^4 q^2$	(3+)	136	≈	136.7	$o\underline{xxooxx}\ldots$	$x\underline{ooxxoo}\ldots$	162[e]	<	174.7	(3+)	$U_o q^4 p^2$
$U_o p^3 q$	(0)	550		548.7			701		701.3	(0)	$U_o q^3 p$
		data	qAs	calc	0.47	0.53	data	pAs	calc		
$U_o p^4 q$	(1)	252	≤	257.6	$xx\underline{o}xx$	$oo\underline{x}oo$	368	≤	372.1	(1)	$U_o q^4 p$
$U_o p^3 q^3$	(2)	152[f]	<	154.5	$xx\underline{ox}oo$	$oo\underline{xo}xx$	147	≤	154.5	(2)	$U_o q^3 p^3$
$U_o p^4 q^2$	(3+)	146[f]	>	136.7	$xx\underline{oxo}x\ldots$	$oo\underline{xox}o\ldots$	179	≥	174.7	(3+)	$U_o q^4 p^2$
$U_o p^3 q$	(0)	550		548.7			694		701.3	(0)	$U_o q^3 p$

[f] term flipping [e] equal values – viewed as seeking reversal

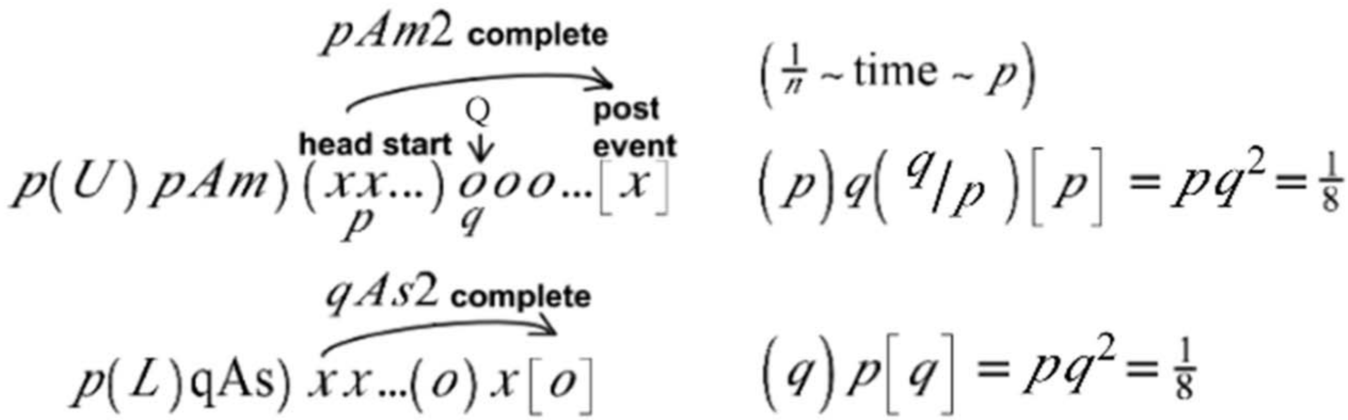
Notice the reversal flip (146[f] ←→152[f]) and the equal values (162[e] = 163[e]) for the term 2 and 3+ stacks. This suggests an expected permutation should occur and may originate from both p, qAs.

Symmetry Set Mirrored Anomaly – The permutation (figure 3) identifies $(pAm1)$ as the final 'common set' prior to the stack shift, the Q event. The next event determines if a $(pAm2)$ set element has occurred or identifies the Q event as the $(qAs1)$ stack element. In both cases the $(pAm1)$ has preceded the Q event. In the case of $(qAs1)$, the next event is the [p] post event [x], which defines the first term in the lower lateral alternating (q) stack sequence.

The head start for the (pAm) stack along with the mirrored rate decrease for the $(qAs1)$ element (that being the qS key) might be viewed as producing a bias for the upper (pAm) stack. The total count for the four key mirrored sets $\{\ qS\dot{p}MpS\dot{q}M\ \}$ are necessarily balanced. This should produce transit rate invariance for the upper and lower alternating stacks. The permutation being considered appears to be the reverse of that suggested by the rate bias for $(pAm2)$ since low term counts exceeding the calculations have been observed for $(qAs1)$ -- that being the first Single (q) event (o) in the (qAs) stack.

Timing Cadence Anomaly – At Q forward, two event steps produce 87.5% of $(pAm2)$ or 100% of the $(qAs2)$ terms for $(p = \frac{1}{2} = q)$

Fig. 5



***The $qAs2$ sequence event rate is equal to the $pAm2$ rate for the second term completion**

When viewed from the head start through the post event the outcome events are asynchronous but the rates are equivalent. For each element of the Am, the given multiple term is of undetermined length. The geometric factor $(r_o = {}^{r}/_{1-r} = 1)$ represents the composite rate for a multiple $(M2+)$ at least 2 elements in length. The square factor prescribes $\{(o)o\ \dots\} = q\left(\frac{q}{p}\right);\{(x)x\ \dots\} = p\left(\frac{p}{q}\right)$.

$$(qAs)\quad q \quad + \quad qp \ + \ q^2p \quad + \quad q^2p^2 \quad . \ . \ .$$

$$(pAm)\ \ p\left(\frac{p}{q}\right) + pq\left(\frac{q}{p}\right) + p^2q\left(\frac{p}{q}\right) + p^2q^2\left(\frac{q}{p}\right) . \ . \ .$$

$$\frac{1}{2} \quad + \quad \frac{1}{4} \quad + \quad \frac{1}{8} \quad + \quad \frac{1}{16} + \ . \ . \ . \ = 1$$

*The Alternating Multiple sets sequence correspondingly to the Alternating Single sets which is the expectation for the four set transit.

As and Am occur asynchronously. For $\{pAm2\ (qM3+)\}, \{\ (\ x\ x\ )o\ o\ o\ .\ .\ .[x]\} = pq^2\left(\frac{q}{p}\right)p = pq^3 = \frac{1}{16}$
For $(qAs3), \{\ (\ o\ )x\ o\ [x]\ \} = q^2p^2 = \frac{1}{16}$. The matching rate may continue indefinitely, but notice the $(pAm2)$ remains static in the second term. Since multiple elements are defined according to the geometric expansion, the rate match for Am sequences with $(M3+)$ elements is questionable.

Fig. 6

	$r =$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$	. . .	
	$qAs\ )\ x\ x$	$(o)[x]$	$(o\ x)[o]$	$(o\ x\ o)[x]$ . . .		
	term: 1	2	3	. . .		
	$As1$	$As2$	$As3$	. . .		
	q	q^2	q^3	. . .		
$qM\ )$	$(x\ x)\ o$	$o\ o$	$o\ o\ o$	. . . $[x]$		$(Am2)$ complete

Mn terms viewed at } (2) $\Longrightarrow P)\ Am = As$ (3+) $\Rightarrow P)\ Am < As$

Naturally, long (Am) multiple elements cannot occur synchronously and maintain a balanced count for the (As) sequence sets. The initial formulations prescribe multiples as reducible by the square factor (term) $r^n = r^{2^{n/2}}$. The square event can be viewed as corresponding to real time (single : multiple) outcomes thereby sequencing at the $\frac{1}{2}$ rate. The varied rate for $(Am : As)$ transit questions the notion of invariant rates for single events and the counts within multiple sets. In other words, for the (Am) and (As) stacks to be synchronized a corresponding pattern must exist within the multiple length sets which is variantly returning the outcome to the opposite event. These corresponding breaks may lend to an increased count or bias for low term (As) events.

Distance Set Count Anomaly – The tendency for the first or lower term counts to exceed the calculations can be viewed as distancing the given combinations. For example the Card Flip data for P) 0.4694 : 0.5306 is reviewed for the multiple stacks:

		qMn		pMn		
distance		progressive	recessive	progressive	recessive	
symbols:	$(o\ o)o$	(2) 289	> ⇃ 364	(2) 297	⊥ ⇃ 275	$(x\ x)o$
> forward	$(o\ o\ o)x$	(3) 186*	⊥ ⇃ 178	(3) 125	> ⇃ 150*	$(x\ x\ x)x$
⊥ stay	$(oooo.\ .)$	(4+) <u>178</u>		(4+) <u>150</u>		$(xxxx\ .\ .)$
		653		572		

The progressive set value compared to the recessive value prescribes the probable expectations. The given multiple sets for $(pM2)$ $\{x\ x\}$ can be considered more likely than $(pM3+)$ $\{x\ x\ x\ .\ .\ .\}$. This means that a predominant pattern exists in which $\{x\ x\}$ is immediately followed by a (q) event $\{\ o\ \}$, thus producing $\{x\ x\ (o)\}$. This expectation might be considered likely since (q) is the higher probability. The data suggests a rate of $\left(\frac{297}{572} = 0.519\right)$. Consider $(pM3)$ $\{x\ x\ x\}$. This set does not demonstrate the stay (⊥) count as does $(pM2)$. On the contrary, $(pM3)$ displays a bias to continue forward (>) to $(pM4)$ $\{x\ x\ x\ (x).\ .\ .\}$. The (p) expectation is occurring at a rate of $\left(\frac{150}{275} = 0.545\right)$. This variant rate is in excess of the converse (q)* rate. Consider the multiple $(qM2)$ $\{o\ o\}$. This set displays the tendency to continue forward (>) to $(qM3\ +)\{\ o\ o\ (o).\ .\ .\}$. Again, this might be considered an invariant expectation but consider term 3 $(qM3)$ $\{o\ o\ o\}$. This set displays a bias to stay ⊥ at $(qM3)$, which requires the sequence {o o o (x) }. This variant (p) rate is $\left(\frac{186}{364} = 0.511\right)$. Again, the set is sequencing (p) at a variant rate nearly equal to the (q)* rate.

Symmetry Set Paradox – The forgoing anomalies lead to the following conclusion. There exists within randomization (contained mixing systems) a tapestry of connected, dimensionally interactive patterns which exceed the invariant rates. The variety of systems, rates and permutable sequences establish randomization as detached from the tether of the defining invariant principle. The perspective which considers each outcome to be discrete and explicitly dependent on the binomial event does not appear adequate. The variant sequences and rates are expected across the entire domain of probability from $\left(\frac{1}{2}\text{ to }0\right)$ and the $\left(\frac{1}{2}\text{ to }1\right)$ counterpart.

To demonstrate the given permutation sequence, figure 3, the card flip data was increased to $U_o = 50{,}000$. The following variant data were obtained for the symmetry set stacks:

P) 0.4694 : 0.5306

Var $\Delta = 0.0002$	(qM)	6607.8	6609 =	$\hat{\approx}$ 5892	5845.4	(pM)	Var $\Delta = 0.0080$
Var $\Delta = 0.0109$	(qS)	5845.4	5909 $\hat{\approx}$	$\doteq$ 6620	6607.8	(pS)	Var $\Delta = 0.0018$

50k Card Flip data

For this data, the given permutation $\{o\ x\ o\ x\ x\ .\ .\ .\ o\ \frac{\boxed{x}}{\boxed{o}}\}$ was observed to occur 1465 times. Calculation predicted 1455.86. The sequence data for the (p) event was 759 for $\{o\ x\ o\ x\ x\ .\ .\ .\ o\ \boxed{x}\}$ and for the (q) event was 706 for $\{o\ x\ o\ x\ x\ .\ .\ .\ o\ \boxed{o}\}$. The data has demonstrated a 'flip' in the rate.

$$Var.data\ \begin{Bmatrix}759\ (x)\\706\ (o)\end{Bmatrix}\ \frac{0.5181}{0.4819}\ (P_v \neq P)\ \frac{0.4694}{0.5306}\ \begin{Bmatrix}687.7\ (x)\\777.3\ (o)\end{Bmatrix}\ Inv.calc.$$

Thought Experiment – As the biased deck of cards (23 red / 26 black) is flipped and the variant rate for the sequenced cued card emerges, it begs the question as to whether the ordered event represents information. If the predictable sequence defies entropy, then it must be asked whether randomness is synonymous with chaos. Does the connectivity of a permutable sequence mean the cards know what color they are? The timing/distance anomalies suggest that the pattern from the data for excess M sets of 3 or 4 red and black cards should remain, even for a deck of 52 cards. For multiple sets $p = q$, the geometric even/odd or go/stay oscillation might be expected to dampen. But the cadence anomaly is a response to the undetermined multiple term counts. Randomness itself introduces variance into the otherwise uniform term expansion.

- The $\{pAm\}\{qAs\}$ permutation demonstrates the flip reversal rate for the data. The converse sequence will also be examined.

$$\{pAm\}\{qAs\} \quad P)\,\frac{0.4694}{0.5306}\quad \{qAm\}\{pAs\}\ \ 50k\ \ Card\ Flip\ data$$

$$\sum_{759}^{706} oxoxx\ldots(o)\ \ (\mathcal{Q})\ \boxed{x}\ 0.5181 \quad \boxed{o}\ 0.4719 \qquad \text{seq.count} = 1465$$

rate flip observed

$$\sum_{912}^{755} xoxoo\ldots(x)\ \ (\mathcal{Q})\ \boxed{x}\ 0.4529 \quad \boxed{o}\ 0.5471 \qquad \text{seq.count} = 1667$$

rate dilation observed

- The distance 'set count' anomaly demonstrates the 'even/odd' go/stay bias for the given observed multiple (p/q) term. For example, $\{o\ o\ \underbrace{x\ x\ x\ x\ x}_{M_5}\ o\ x\ o\ \underline{x\ x}\ \underline{o\ o}\ x\ \underline{o\ o\ o}\ \underbrace{x\ x\ x\ x\ x\ x}_{M_{5+}}\ .\ \ .\ \ .\}$ represents a multiple set distance of $dx)3$ for the (pqM_5). Several (k) samplings of card flips were made with $p \approx q$. $qn^{dx} = \frac{1}{2}$ are tested and observed. $p = \left(\frac{1}{2}\right)^{n-2}$; $q = 1 - p$; $\log_q\left(\frac{1}{2}\right) = dx$. The multiple count issue for unknown term expansion seems to be identifiable in one pattern. Logarithmic dampening appears uniform for the return of set counts within predictable (M_{n+}) distances. The $\frac{r}{1-r}$ coefficient thereby provides continuous information variantly as events proceed.

$r = \frac{p}{q}$ ⇂

(return to p)

	M_4		M_5		M_{6+}	
dx	prog.	rec.	prog.	rec.	prog.	rec.
0	35	111 (2.4)	7	71	5	83
1	28	83 * <73⇂	14	57	3	80
2	20	63	7	50	4	76
3	15	48	6	44 (5.2)	6	70
4	13	35	5	*39 <39⇂	8	62
5	12	23	8	31	4	58
6	2	21	4	27	5	53 (10.7)
7	9	12	3	24	6	47 <44⇂
8	2	10	3	21	5	42
9	1	9	3	18	1	41
10	1	8	2	16	4	*37
11	12	6	1	15	2	35
12	2	4	1	14	1	34
13	3	1	1	13	1	33
14	--	1	1	12	--	33
15	--	1	4	8	1	32
16	7		1	7	1	31
17+	146		$^{7}/_{78}$		$^{31}/_{88}$	

A study for a common casino game was used to confirm technique. The game provides a banker advantage over the player. The rate Δ is 1.25%. In the study, $\{p, q, M_{6+}\}$ tracking revealed an excessive 'return' within the lower terms and the distance returns for the (M_{6+}) extended to larger distances than logarithmically projected.
Recorded data is linked for the observer, one play session to the next observed session. The event continuity is maintained for the stacked counts. Distance sets will perpetually follow the extended terms and rates across time. A test, in which data cards were resorted, continued to match the variant patterns for the observer. A paradoxical question arises: If several selections from a mixing system results in repetitively (lo/hi) probability events, does this alter the probability rate? If the chosen element is returned for each selection, the rate should not vary. The return/distance ratio should maintain the invariant rate, following the $\{r^2(1-r)^n\}$ summation. This dampening formula suggests the highest probability for the low rate event to recur is therefore, the next event. However, the increasingly dampened rate $(1-r)^n$ remains constant, as (n) increases and the return distance also increases. For particular (lo) combinations, variant return distances are observed, exceeding asymptotic limits. The underlying connectivity in random sequenced events is identified by the shared rate discrepancies. The permutable low term sets are described as a "halo" of variant events and the spike for precise high terms sets as 'tails', i.e. the 50k card flip symmetry set data. An approach to quantify the variant rate will begin by manipulating the geometric sequence for term expansion. The derivation will seek a general expression for the anomalous probability variance, P_v .

Probability Variance – Theorem 2.0

The Lateral Transition is defined as term (0). $\{p, qAs)1$ and $p, qAm)1\}$

$$(0)\ U_o p\ \{(o)\ \underline{x\ o}\ [x]\} = U_o p^3 q \qquad \text{—LT—} \qquad (0)\ U_o q\ \{(x)\ \underline{o\ x}\ [o]\} = U_o q^3 p$$

The Opposite Transition is defined as term (1).

$$(1)\ U_o p\ \{(o)\ x\ \underline{o}\ x\ x\ldots[o]\} = U_o p\ \{pq\left({}^{p^2}/_{q}\right)\ q\} \qquad \text{—OT—} \qquad (1)\ U_o q\ \{(x)\ o\ \underline{x}\ o\ o\ldots[x]\} = U_o q\ \{qp\left({}^{q^2}/_{p}\right)\ p\}$$

The Opposite Transition Leak is defined as term (2+). The $\left(\frac{r}{1-r}\right)$ geometric summation provides numerical equivalence for the (As / Am) factor stack derived progression (figure 4).

$$(2+)\ U_o(p^4q)\sum_{1}^{\infty} q^n = U_o\ (p^4q)\ {}^{q}/_{p} = U_o p^3 q^2 \qquad \text{—OTL—} \qquad (2+)\ U_o(q^4p)\sum_{1}^{\infty} p^n = U_o(q^4p)\ {}^{p}/_{q} = U_o q^3 p^2$$

The Lateral Transition Progression is the given term 2+ progression substituted for the (As / Am) factor stack derived progression (figure 4).

$$(2+)\ U_o(p^3q^2)\ q\sum_{0}^{\infty} p^n = U_o(p^3q^2)\left(q + q\ {}^{p}/_{q}\right) = U_o(p^3q^2)(q+p) = U_o p^3 q^2 \qquad \text{—LTP—} \qquad (2+)\ U_o(q^3p^2)\ p\sum_{0}^{\infty} q^n = U_o(q^3p^2)\left(p + p\ {}^{q}/_{p}\right) = U_o(q^3p^2)(p+q) = U_o q^3 p^2$$

It is shown that term (0) equals the sum of terms (1) and (2+) :

$$\begin{aligned} &(0) \quad (1) \quad (2+) \\ p^3q &= p^4q + p^3q^2 \\ &= p^3q(p+q) \\ &= p^3q \end{aligned} \qquad \begin{aligned} &(0) \quad (1) \quad (2+) \\ q^3p &= q^4p + q^3p^2 \\ &= q^3p(q+p) \\ &= q^3p \end{aligned}$$

In the forgoing, it has been established that term 2+ for the (As / Am) factor stack progression is equivalent to the geometric sum. Term a_0 is thus defined.

Th 2.0 $\qquad p, qa_o = pq\,\text{OTL} = pq\,\text{LTP}$

$$\begin{aligned} pa_o = p^3q^2 &= a_o q \sum_0^\infty p^n \\ &= (p^3q^2)\left(q + q\frac{p}{q}\right) \\ &= (p^3q^2)(q+p) \\ &= (p^3q^2) \\ &= a_o \end{aligned} \qquad \begin{aligned} qa_o = q^3p^2 &= a_o p \sum_0^\infty q^n \\ &= (q^3p^2)\left(p + p\frac{q}{p}\right) \\ &= (q^3p^2)(p+q) \\ &= (q^3p^2) \\ &= a_o \end{aligned}$$

$$_{\text{r}}a_0 = r^3(1-r)^2 = a_0(1-r)\sum_0^\infty r^n = \underbrace{a_0(1-r)}_{a_0} + \underbrace{a_0(1-r)r}_{a_1} + \underbrace{a_0(1-r)r^2}_{a_2} + \ldots + \underbrace{a_0(1-r)r^{n-1}}_{a_{n-1}}$$

$$\text{exp. 2.1: } a_o = \underbrace{\left[p, q\,\text{OTL}\,\tfrac{U}{L}\right](1-r)}_{a_0 \,/\, a_1} + \underbrace{a_1\left(\tfrac{r^2}{1-r^2}\right)}_{a_1\hat{} \,/\, a_3 + a_5 + \ldots} + \underbrace{a_1 r}_{a_2 \,/\, a_2} + \underbrace{a_2\left(\tfrac{r^2}{1-r^2}\right)}_{a_2\hat{} \,/\, a_4 + a_6 + \ldots} = p, q\,\text{OTL} = p, q\,\text{LTP}$$

$(a_n\hat{}\ {}^{\text{even}}_{\text{odd}}$ term ≤ sum

(1)257.6 { $o\ \underline{x\,x},\ (o)$ — p UOT; $x\,x,\ \underline{o}\ (x\,x,)$ — p LOT; $U_o p^4 q$ } — OT to LT stacks 10k calc (0.4694 |0.5306 — { q UOT $x\ \underline{o\,o},\ (x)$; q LOT $o\,o,\ \underline{x}\ (o\,o,)$; $U_o q^4 p$ } 372.1

$a_o(2+)$ 291.2 $\qquad U_o p^3 q^2 \quad p$ OTL $\qquad\qquad q$ OTL $\quad U_o q^3 p^2 \qquad$ 329.2

$$\begin{pmatrix} 198.2 - \dfrac{x}{o\,o} & (a_1 + a_1\hat{}) & \dfrac{o}{x\,x} - 215.0 \\ 93.0 - \dfrac{o}{x\,x} & (a_2 + a_2\hat{}) & \dfrac{x}{o\,o} - 114.1 \end{pmatrix}$$

OT / LT , LT / OT

OT/LT , LT/OT

(2)	a_1 154.5	$o(xx, oo,)\underline{x}$ $xx, (ox)\underline{oo,}$	p^3q^3	$q\dfrac{(U)\text{LTP}}{(L)\text{LTP}}p$	q^3p^3	154.5	$x(oo, \underline{xx,})\underline{o}$ $oo, (xo)\underline{xx,}$
(3)	a_2 72.5	$o(xx, oo, xx,)\underline{o}$ $xx, (oxo)\underline{xx,}$	p^4q^3	⇂ p $\quad q$ ⇂	q^4p^3	82.0	$x(oo, xx, oo,)\underline{x}$ $oo, (xox)\underline{oo,}$
(4)	a_3 34.0	$o(xx, oo, xx, oo,)\underline{x}$ $xx, (oxox)\underline{oo,}$	p^5q^3		q^5p^3	43.5	$x(oo, xx, oo, xx,)\underline{o}$ $oo, (xoxo)\underline{xx,}$
:	⁝/291.2	:	:		:	⁝/329.2	:

10k calc | Index | $P)0.4694: 0.5306$

Upper OT / Upper LT

$$\underset{\text{A.}}{(p)\quad \underline{oxx,}\,(o)}\begin{cases}\underline{o(xx,}\,oo,)x & 198.2\\ \underline{o(xx,}\,oo,xx,)o & \underline{93.0}\end{cases}\quad 291.2$$

$$\underset{\text{C.}}{(q)\quad \underline{xoo,}\,(x)}\begin{cases}\underline{x(oo,}\,xx,)o & 215.0\\ \underline{x(oo,}\,xx,oo,)x & \underline{114.1}\end{cases}\quad 329.2$$

Lower OT / Lower LT

$$\underset{\text{B.}}{(p)\quad \underline{xx,o}(xx,)}\begin{cases}\underline{xx,(o}x)oo, & 198.2\\ \underline{xx,(o}xo)xx, & \underline{93.0}\end{cases}\quad 291.2$$

$$\underset{\text{D.}}{(q)\quad \underline{oo,x}(oo,)}\begin{cases}\underline{oo,(x}o)xx, & 215.0\\ \underline{oo,(x}ox)oo, & \underline{114.1}\end{cases}\quad 329.2$$

Lower LT / Upper OT

$$\left.\begin{matrix}(q)\\ oo,(x\underline{o)xx,}\\ xx,(ox\underline{o)xx,}\\ (p)\end{matrix}\right\}\underline{oxx,}\,(o)\quad \text{E.}\quad \begin{matrix}215.0\\ \underline{93.0}\\ 308.1\end{matrix}$$

$$\left.\begin{matrix}(p)\\ xx,(o\underline{x)oo,}\\ oo,(xo\underline{x)oo,}\\ (q)\end{matrix}\right\}\underline{xoo,}\,(x)\quad \text{G.}\quad \begin{matrix}198.2\\ \underline{114.1}\\ 312.3\end{matrix}$$

Upper LT / Lower OT

$$\left.\begin{matrix}(q)\\ x(oo,\underline{xx,)o}\\ o(xx,oo,\underline{xx,)o}\\ (p)\end{matrix}\right\}\underline{xx,o}(xx,)\quad \text{F.}\quad \begin{matrix}215.0\\ \underline{93.0}\\ 308.1\end{matrix}$$

$$\left.\begin{matrix}(p)\\ o(xx,\underline{oo,)x}\\ x(oo,xx,\underline{oo,)x}\\ (q)\end{matrix}\right\}\underline{oo,x}(oo,)\quad \text{H.}\quad \begin{matrix}198.2\\ \underline{114.1}\\ 312.3\end{matrix}$$

Consider E (all lateral transitions sequencing to p(UOT)), an input value of 308.1 events. Consider A (all lateral transitions sequencing from p(UOT)), an output value of 291.2 events. The same is true for F to B.

Consider the symmetry set permutation $\{pAm\}$ $\{qAs\}$, $\{oxoxx, ox\}$ corresponding to all (LLT) input to (p UOT). (Q)

exp 2.2 $$pa_o = [p \text{ (UOT) output}] = [p, q\text{(LTP) input}] \sum_1^{\infty} r^n$$

(following index)

$$A = E \sum_1^{\infty} r^n$$

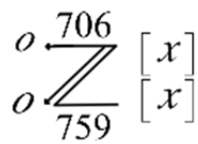
$$291.2 = 308.1 \ \frac{r}{1-r}$$

$$r = 0.4859$$

data

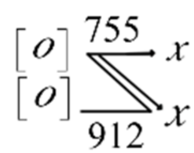
Thus $(P_v) = \frac{0.4859}{0.5141}$. This rate predicts (0.5141 x 1465 = 753.2) given $\{pAm\}$ $\{qAs\}$ sequences, of which 759 were observed for the 50k card flip data. Consider the two given permutations:

'flip'	inv.	data	calc.
$\{pAm\}\{qAs\}$	$P)\ \frac{0.4694}{0.5306}\ \frac{\boxed{x}}{\boxed{o}}$	$P)\ \frac{0.5181}{0.4819}\ \frac{\boxed{x}}{\boxed{o}}$	$P_v)\ \frac{0.5141}{0.4859}\ \frac{\boxed{x}}{\boxed{o}}$



If $P_\Delta = |P_v - P|$ is considered, then the rate 'dilation' for the converse sequence can be examined. Thus, $P_d = P \pm P_\Delta$.

'dilation'	inv.	data	calc.
$\{qAm\}\{pAs\}$	$P)\ \frac{0.4694}{0.5306}\ \frac{\boxed{x}}{\boxed{o}}$	$P)\ \frac{0.4529}{0.5471}\ \frac{\boxed{x}}{\boxed{o}}$	$P_v)\ \frac{0.4529}{0.5471}\ \frac{\boxed{x}}{\boxed{o}}$



Experimental data corresponds to the 'flip' and 'dilation' variant rates with exceedingly high and precise matches.

The foregoing (Lateral Transition Progressions) is viewed as linear term geometric series. The (As / Am) factor stacks operate with a twin p/q oscillation, which, in fact, produce greater step-by-step accuracy. Nevertheless, the array of anomalous observations persists. The convergence for both sequences at infinite term summation appears to suggest 'dualistic' probabilities. A general expression for (P_v) will be derived for examination at infinite limits.

Th 2.0 $p\ a_o = p\ \text{OTL} = p\ \text{LTP}$

exp 2.2 $p\ a_o = [p(\text{UOT})\ \text{output}] = [p, q(\text{LTP})\ \text{input}] \sum_1^\infty r^n$

(following index)

$$A = E \sum_1^\infty r^n$$
$$A = E\left(\frac{r}{1-r}\right)$$

$r = \frac{A}{A+E}$ neglect U_o

$P_v = \frac{A}{A+(qE+pE)}$

a_2 m factor= (pq)

$A = p^4 q\left(\frac{q}{p}\right)$; $qE = a_1 + a_1$^ ; $pE = a_2 + a_2$^

$= p^3q^2$ $\quad = \left[q^4 p\left(\frac{p}{q}\right)\right] p\ (1 + \frac{q^2}{1-q^2}\ )$ $\quad = [p^4 q\left(\frac{q}{p}\right)\ qp\ \left(1 + \frac{p^2}{1-p^2}\right)$

$= q^3p^3\ \left(1+\frac{q^2}{1-q^2}\right)$ $\quad = p^4q^3\ \left(1+\frac{p^2}{1-p^2}\right)$

$$P_v = \frac{A}{A+(qE+pE)} = \frac{p^3q^2}{p^3q^2 + p^3q^3\left(1+\frac{q^2}{1-q^2}\right) + p^4q^3\left(1+\frac{p^2}{1-p^2}\right)}$$

$$= \frac{p^3q^2}{p^3q^2 + p^3q^3 + \frac{p^3q^5}{1-q^2} + p^4q^3 + \frac{p^6q^3}{1-p^2}}$$

$$= \frac{p^3q^2}{p^3q^2 + p^3q^2\left(1+q+\frac{q^3}{1-q^2}\right) + pq + \frac{p^3q}{1-p^2}}$$

$$= \left(1+q+qp+\frac{q^3}{1-q^2}+\frac{p^3q}{1-p^2}\right)^{-1}$$

$$= \left[1+(1-p)+(1-p)p+\frac{(1-p)^3}{1-(1-p)^2}+\frac{p^3(1-p)}{1-p^2}\right]^{-1}$$

$$= \left[2+\frac{1-p}{p^2-1}+\frac{p-1}{p^2-2p}\right]^{-1}$$

polynomial division and simplification yields:

exp 2.3 $$P_{v_1} = \frac{1}{2} + \frac{\frac{1}{4}-\frac{1}{2}p}{p^3-p^2-p-\frac{1}{2}}$$

Another review for lateral transition input can be considered with the p-component set to the balanced rate of $\left(\frac{1}{2}\right)$. The input from the q-component might be viewed as static; while the input from the p-transition may dampen to equivalence.

$r = \frac{A}{A+E}$ neglect U_o

$P_v = \frac{A}{A+(qE+pE)}$

; a_2 m factor= $\left(\frac{1}{2}\right)^2$

$A = p^4 q\left(\frac{q}{p}\right)$; $qE = a_1 + a_1$^ ; $pE = a_2 + a_2$^

$= p^3 q^2$ $= \left[q^4 p\left(\frac{p}{q}\right)\right] p\left(1 + \frac{q^2}{1-q^2}\right)$ $= \left[p^4 q\left(\frac{q}{p}\right)\right]\left(\frac{1}{2}\right)^2\left(1 + \frac{\left(\frac{1}{2}\right)^2}{1-\left(\frac{1}{2}\right)^2}\right)$

$= q^3 p^3\left(1 + \frac{q^2}{1-q^2}\right)$ $= \frac{1}{3} p^3 q^2$

$$P_v = \frac{A}{A + (qE + pE)} = \frac{p^3 q^2}{p^3 q^2 + p^3 q^3\left(1 + \frac{q^2}{1-q^2}\right) + \frac{1}{3} p^3 q^2}$$

$$= \frac{p^3 q^2}{p^3 q^2 + q^3 p^3 + \frac{q^5 p^3}{1-q^2} + \frac{1}{3} p^3 q^2}$$

$$= \frac{p^3 q^2}{p^3 q^2\left(1 + q + \frac{q^3}{1-q^2} + \frac{1}{3}\right)}$$

$$= \left(\frac{4}{3} + q + \frac{q^3}{1-q^2}\right)^{-1}$$

$$= \left[\frac{\frac{4}{3} - \frac{4}{3}q^2 + q}{1-q^2}\right]^{-1}$$

$$= \left[\frac{4}{3} - \frac{q}{q^2 - 1}\right]^{-1}$$

$$= \left[\frac{4}{3} - \frac{1-p}{(1-p)^2 - 1}\right]^{-1}$$

simplification yields:

exp. 2.4 : $P_{v_2} = \frac{p^2 - 2p}{\frac{4}{3}p^2 - \frac{5}{3}p - 1}$

Variant expressions; derivatives at limits:

$$P_{v_1} = \frac{1}{2} + \frac{\frac{1}{4} - \frac{1}{2}p}{p^3 - p^2 - p - \frac{1}{2}}$$

$$P'_{v_1} = \frac{d}{dp}\left[P_{v_1}\right] = \frac{-\frac{1}{2}}{p^3 - p^2 - p - \frac{1}{2}} - \frac{-6p^3 + 7p^2 - 1}{(2p^3 - 2p^2 - 2p - 1)^2}$$

$$\lim_{p \to 0} P'_{v_1} = {P_{v_1}}'(0) = 2$$

And

$$P_{v_2} = \frac{p^2 - 2p}{\frac{4}{3}p^2 - \frac{5}{3}p - 1}$$

$$P'_{v_2} = \frac{d}{dp}\left[P_{v_2}\right] = \frac{2p - 2}{\frac{4}{3}p^2 - \frac{5}{3}p - 1} - \frac{\left(\frac{8}{3}p - \frac{5}{3}\right)(p^2 - 2p)}{\left(\frac{4}{3}p^2 - \frac{5}{3}p - 1\right)^2}$$

$$\lim_{p \to 0} P'_{v_2} = {p_{v_2}}'(0) = 2$$

In both cases, the derivative is 2. The fact that the (P_v per P) graph will slope at two times the invariant rate, as the probability approaches zero may provide observable phenomenon.

P'_{v_1} at $p = \frac{1}{2}$ is $\frac{4}{9} = 0.444...$ and P'_{v_2} at $p = \frac{1}{2}$ is $\frac{5}{9} = 0.555...$

As the invariant rate approaches (p: q) equivalence, the (P_v per P) slopes will complement the $\frac{1}{2}$ rate explicitly:

$$\lim_{p \to \frac{1}{2}} \left(\frac{dP_v}{dp}\right) = \begin{cases} P'_{v_1} + P'_{v_2} = 1 \\ \left(\frac{1}{2} - \frac{4}{9}\right) + \left(\frac{1}{2} - \frac{5}{9}\right) = 0 \end{cases}$$

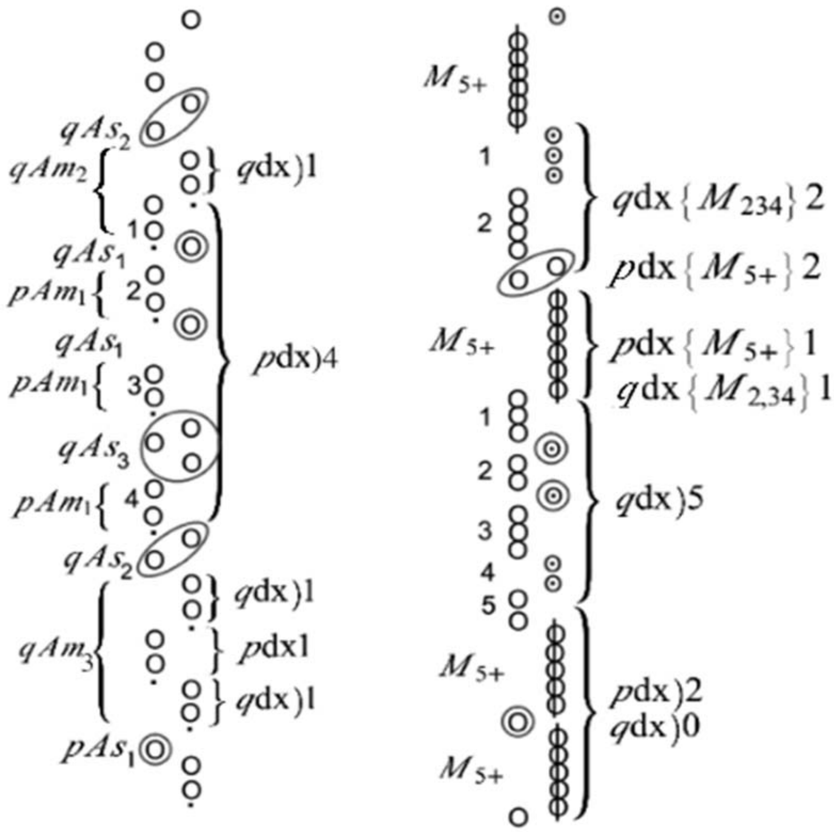
Devil's Tail – A property of mean stack count dilation

Consecutive multi-sets produce runs which can be viewed in a number of ways. Within the alternating, multi-set (Am) brackets, $\{pM\}$ and $\{qM\}$ sets partition one another. (Am) brackets are likewise partitioned by the alternating single (As) brackets.

Fixed rate | structured $P)\ \frac{7}{8} : \frac{1}{8}$

$p : q$ elements | 50: 50 elements

$(p)(q)$ | (o)(⊙)



Notice the distance runs for the p dx$\{M_{5+}\}2+$ must be partitioned by (As_n) brackets for the structured runs. The $\{qM\}$ runs may be counted concurrently without regard to (As) brackets. For fixed rate (M) elements, the given consecutive runs for either (p or q) must be partitioned by (As) brackets for dx)2 +, dx)1 events may occur within the (Am) brackets. The prior permutations represent an example of fixed rate closed randomness, {oxoxx, o$\frac{\boxed{\text{X}}}{\boxed{\text{O}}}$}. This is considered as a variant rate expectation for $\{rAs, pM, qAs\}$.
It is considered that the given rate for the multi-set stack counts are expressed by '1′ for both (p) and (q). The multi-set summation is expressed by $\left(\frac{1}{q}\right)$ for (p) series and $\left(\frac{1}{p}\right)$ for (q) series (see expressions). In each case, the multi-set summations are greater than one. Notice the $\{qMs\}$ summations exceed the invariant component by '1'. For $\left(\frac{3}{4}\right)$ the average distance for the (q) run $\sum\{qMs\}$ should be (3) and the (p) stack count $\sum\{pMct\}$ will reflect '1'. Thus, $\left(\frac{3}{4} : \frac{1}{4}\right)$ is not validated by the spontaneous variant sum of $q(4)$.

dx) stack example

$p\left(\frac{1}{8}\right) = \frac{8}{7}$ for $\frac{1}{q}$

$q\left(\frac{7}{8}\right) = 8$ for $\frac{1}{p}$

$p\left(\frac{1}{4}\right) = \frac{4}{3}$ for $\frac{1}{q}$

$q\left(\frac{3}{4}\right) = 4$ for $\frac{1}{p}$

$r\left(\frac{1}{2}\right) = 2$ for $\frac{1}{r}$

$\sum\{qMct\}$ (Multi-Set Stack Counts) $\sum\{pMct\}$

$U_1)(p)\left(p + \frac{pq}{p}\right)$

$U_1)(p^2 + pq) = \underline{U_1}p$

$$\left.\begin{matrix} 1)\ p \\ 2)\ pq \\ 3)\ pq^2 \\ \vdots \end{matrix}\right\} p\sum_0^\infty q^n = p + q = 1$$

$U_1(q)\left(q + \frac{qp}{q}\right)$

$U_1)(q^2 + qp) = \underline{U_1}q$

$$\left.\begin{matrix} 1)\ q \\ 2)\ qp \\ 3)\ qp^2 \\ \vdots \end{matrix}\right\} q\sum_0^\infty p^n = q + p = 1$$

The mixing systems 'return' to the converse event, (p) stacks 'return' to $\{q\}$ sets and (q) stacks 'return' to $\{p\}$ sets. Multi-set 'returns' will stack along (As) brackets, $\{\underset{1}{M}, As, \underset{2}{M}, As, \underset{3}{M}, ..\}$ exclusively for some observed systems.

(Multi-Set Summation)

$$\sum\{pMs\} \qquad \lim_{k\to\infty} \qquad \sum\{qMs\}$$

$$U_1)\frac{q}{p}\sum_{1}^{\infty} np^n \qquad\qquad U_1)\frac{p}{q}\sum_{1}^{\infty} nq^n$$

$$= U_1\left(\frac{q}{p}\right)\sum_{n=0}^{k} kp^k \qquad\qquad = U_1\left(\frac{p}{q}\right)\sum_{n=0}^{k} kq^k$$

$$= U_1\left(\frac{q}{p}\right)\left(\frac{p-(n+1)p^{n+1}+np^{n+2}}{(p-1)^2}\right) \qquad = U_1\left(\frac{p}{q}\right)\left(\frac{q-(n+1)q^{n+1}+nq^{n+2}}{(q-1)^2}\right)$$

$$= U_1\left(\frac{q}{p}\right)\left(\frac{p}{q^2}\right) = U_1)\frac{1}{q} \qquad\qquad = U_1\left(\frac{p}{q}\right)\left(\frac{q}{p^2}\right) = U_1)\frac{1}{p}$$

$$\left.\begin{matrix}1)\ q\\ 2)\ qp\\ 3)\ qp^2\\ \vdots\end{matrix}\right\}\frac{q}{p}\sum_{1}^{\infty} np^n = \frac{q}{p}\left(\frac{p}{q^2}\right) = \frac{1}{q} \qquad \left.\begin{matrix}1)\ p\\ 2)\ pq\\ 3)\ pq^2\\ \vdots\end{matrix}\right\}\frac{p}{q}\sum_{1}^{\infty} nq^n = \frac{p}{q}\left(\frac{q}{p^2}\right) = \frac{1}{p}$$

$$\begin{matrix}U_0)\ 6{,}000\\ dx)\ q[234]\end{matrix}\left.\begin{matrix}1\\2\\4\\7\end{matrix}\right\}\frac{7}{8} : \frac{1}{8}$$

	q(data)	$\sum\{q\}$	calc
1)	76 p	76	81.3
2)	70 pq	140	71.1
3)	63 pq^2	189	62.2
4)	54 ·	216	54.4
5)	44 ·	220	47.6
6)	48 ·	288	41.7
7)	31 ·	217	36.5
8)	35 ·	280	31.9
9)	23 ·	207	27.9
10+)	(206)	(3530)	(195.4)
	650	5363	650.0

Exact data matches for variantly long summation stacks are observed in the variety of contained random systems. The variantly greater sum in the example is shown to maintain the <u>invariant rate</u> if the (q) summation is divided by the corresponding (p) summation $\left(\frac{4}{4/3}\right) = 3$. The given count of 3 (q) elements for each single (p) element provides the $\left(\frac{3}{4} : \frac{1}{4}\right)$ ratio. However, the <u>variantly</u> long runs for both (p and q) sequences are observed in the variety of mixing systems. The <u>perturbations</u> occur simultaneously given $(n+1>n)$.

For example, a common casino card game, which is nearly $50:50$, can be played using a structured rate and 3 small adjusted progressions. The naturally disruptive q dx$\{p\}$ logarithmic distance can be avoided using the dilated runs to provide a method without compound losses.

Consider a small rate 'delta' such as that in the foregoing data. This will produce an increase in the term 1 count for the (p) stacks and a decreased term 1 count for (q) stacks. Simultaneously, the consecutive (As) partitioned (p) stacks will produce variantly high $\{As, M, As\}$ sets at the rate of $\left(\frac{p}{q}\right)$ for terms (3+). This is far in excess of (p)

	$dx)$ p[5+]		
	p(data)	$\sum\{p\}$	calc
1)	575 q	575	568.8
2)	60 qp	120	71.1
3)	12 qp^2	36	8.9
4)	3 ⋮	12	↓ 1.3
	650	743	650.0

$(q\ \text{ct})r = \frac{5363}{650} = 8.25$ Dilation

$(qs)r = \frac{5363}{743} = 7.22$ Expected variance

invariance; the sets reflecting (0.89) rather than (0.47) rates. The observed exceptionally long multi-set $\sum\{Ms\}$ run phenomenon appears to originate from the modulation of the excess low set count being reduced by the larger element length, the increased distance for given combinations. These anomalous sets are labeled the 'Devil's Tail'.

$U_1=U_0(pq)$ U_1 represents the 'return' count for both q:p stacks. In the given data, 650 combinations result from the consecutive $_q$Mset [2,3,4] ending in 650 $_p$Mset [5+]. Notice that the distance (dx) analog equates to combination lengths and their counts. The distance 'return' concept will be used to demonstrate a waveform analog for explicit trigonometric limits in the subsequent data for a circumferential random system. Macro quantum wave length:radian variance is thereby observed.

Term zero distance – Varied descending term (0,1,2) counts, non-sequential origination.

The formulations for term summation can be phased for the (n-1) progressive stacks by applying the coefficient (p) for the p-stack series and (q) for the q-stack series. This results in $[U_1)q/p]$ for the q-stack and $[U_1)p/q]$ for the p-stack. For the given data, 4553 consecutive 'zero distance' dx)0 sets are obtained for the q-stack and 93 dx)0 sets for the p-stack, (1)60+(2)12+(3)3 = 93. [Zero (dx) term counts] multiplied by the (Square) of the first term coefficient for the q:p stacks divided by the converse rate provides the resulting progressive first term values. $[U_1)q/p](p^2/q)$ for q-stack, thus [(p)Term 0)=4553] and [Term 1)=81]. $[U_1)p/q](q^2/p)$ for the p-stack, thus[(q)Term 0)=93] and [Term 1)=569].

The given multiplying factors for the zero term count thus validates the first term coefficient for the q:p stacks as (p) for the q-stack and (q) for the p-stack. However, a variety of open and closed random systems have demonstrated distinct and repetitive variant high rates for the first and often low terms for each of the combinational elements. A natural low term variant bias is therefore observed outside the mean calculations for each random event. The given perturbations are thereby producing observable sequenced permutations. All series terms have been observed to modulate from the static zero term node.

	[p.p + p.q.p + p.qq.p + p.qqq.p + …]		[p.p + p.p.p + p.p.p.p + …]
dx)p term)	0 1 2 3 …	$_q$dx)0 term)	1 2 3 …

A principle of spontaneous rate variance produces non-linear counts in the p:q progressive sets. All randomizing systems closely maintain the equivalent p:q total stack combination count (U_1). Zero term p:q square rate divergence tends to favor excess (p) stack low terms due to the (q^2/p) coefficient and expanded (q) stack higher terms due to the (p^2/q) factor. Waveform harmonics can be expected to result from the p:q stack (term zero:term one) enigma. Notably, both p,q stacks (term 2) equal values are the product of both p,q (term 0) rates, (p,q term 2)$=U_0(pq)^2$. Two extreme possibilities exist for the range of (p+q=1). For a large database when $U_1=1$, (term 0) is large for both p,q stacks and (term 1)=0. If (term 1) is large then (term 0)=0. Discontinuity of the p:q stack term (0,1) factors spontaneously produce non-linear progressions.

$U_0[(1-r)r][r/(1-r)][(1-r)^2/r] = U_0[r(1-r)^2]$ (Term0) Square flux factors $\{p^2/q : q^2/p\}$

. ----U_1----. .---Term1---.

. -------Term0--------.

. --------------Term1----------------.

Th. 3.0 The Complex Identity: $\left(\frac{1}{2} \pm \frac{1}{2} i\right)$; $\left(\frac{1}{\sqrt{2}} \pm i \frac{1}{\sqrt{2}}\right)$; $|P_z|$

1) $r = |z| = |x + iy| = \sqrt{x^2 + y^2}$; $|z|$ magnitude of vector r identity

2) $\frac{r}{|z|} - \frac{x}{|z|} = \frac{iy}{|z|} = \sin\left(\frac{\pi}{2}\right) = 1$

-limit condition-

3) $1 - \cos\theta \cong |P_z|$; $\lim\limits_{\theta \to \frac{\pi}{2}} (\sin\theta) = 1 \cong \frac{P_v}{p}$

4) $\lim\limits_{x \to 0} \left(\frac{1 - \cos x}{x^2}\right)$; $\lim\limits_{x \to 0} \left[\left\{\frac{P_v}{p}\right\} \cong |P_z| \cong |Z_n| = i\right]$

5) $\lim\limits_{p \to 0} \left(\frac{1 - \cos p}{p^2} = \frac{\sin p}{2p} = \frac{\cos p}{2}\right) = \frac{1}{2}$ by L'Hôpital's Rule

$\Longrightarrow \frac{\theta = \frac{1}{2} \;:\; iy = 1}{x = iy = \frac{1}{2} \;:\; |P_z| = \frac{1}{\sqrt{2}}}$ Cycloid imprint ($P_v \cong 2p \cong 2x$)

6) $\lim\limits_{p \to 0} |P_z| = \lim\limits_{p \to 0} (r) = \frac{1}{\sqrt{2}}$; $\lim\limits_{p \to 0} (x) = iy = \frac{1}{2}$; $r = \sqrt{x^2 + y^2}$

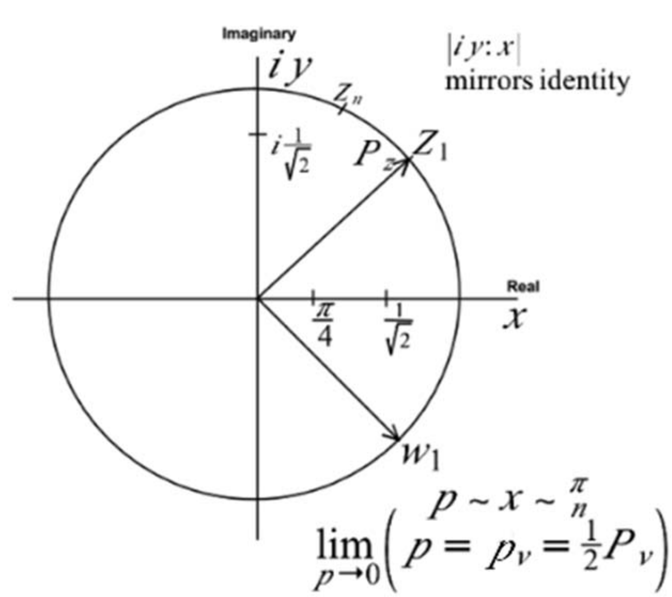
$$\frac{1}{\sqrt{2}} = \sqrt{\left(\frac{1}{2}\right)^2 + \left(\frac{1}{2}\right)^2}$$

$$\lim_{p \to 0} |P_z| = \left| \frac{1}{\sqrt{2}} \left(\frac{1}{2} \Big/ \left(\frac{1}{\sqrt{2}}\right) + i \, \frac{1}{\sqrt{2}} \Big/ \left(\frac{1}{\sqrt{2}}\right) \right) \right|$$

$$\lim_{p \to 0} |P_z| = \left| \frac{1}{\sqrt{2}} \left(\cos\left(\frac{\pi}{4}\right) + i \sin\left(\frac{\pi}{4}\right)\right) \right| = \left| \frac{1}{2} + i \frac{1}{2} \right| = r = \frac{1}{\sqrt{2}}$$ $*$ complex identity

7) $\frac{\left|\frac{1}{2} + i\frac{1}{2}\right|}{\frac{1}{\sqrt{2}}} = \left| \frac{1}{\sqrt{2}} + i \frac{1}{\sqrt{2}} \right| = \frac{|P_z|}{r} = 1$ $*$ $|P_z|$ unit rate

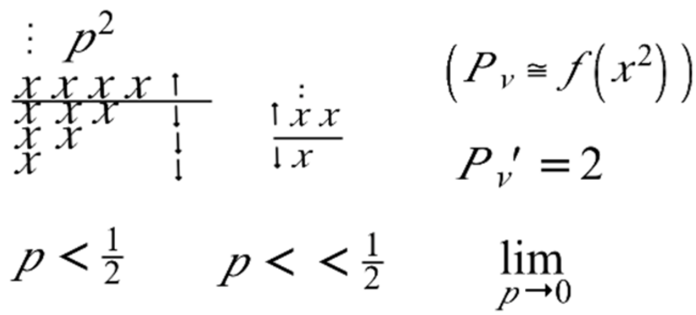
8) $2\pi r^2 = 2\pi \left(\frac{1}{2}\right)^{2/2} = \pi$



Pythagorean : Polar Analog

The polar form expression for the complex plane establishes the real vector (r) as coincident with the complex number (z). The limit conditions for the orthogonal x: y scale can be considered the domain for the unit circle. The probability rate for p: q observed events corresponds to the x-axis and the $\frac{\pi}{2}$ radian measures.

For $x = 1, p = 0, q = 1, \text{rad} = 0$.
For $y = 1, \text{rad} = \frac{\pi}{2}, (P) = 0$.
Since $n = \infty$ for $\frac{1}{n} = P = 0$
$\therefore\ \frac{\pi}{2}$ corresponds to $x = P = 0$
$(1 - \cos\theta = i\sin\theta)$
expresses real number accuracy for $\left(0, \frac{1}{2}\right)$ limits. For P limit zero, $iy = 1$. For a limitless sum of events iy will correspond to $P = 1$. $\therefore$ $(iy = x = 1)$ for limit ∞.



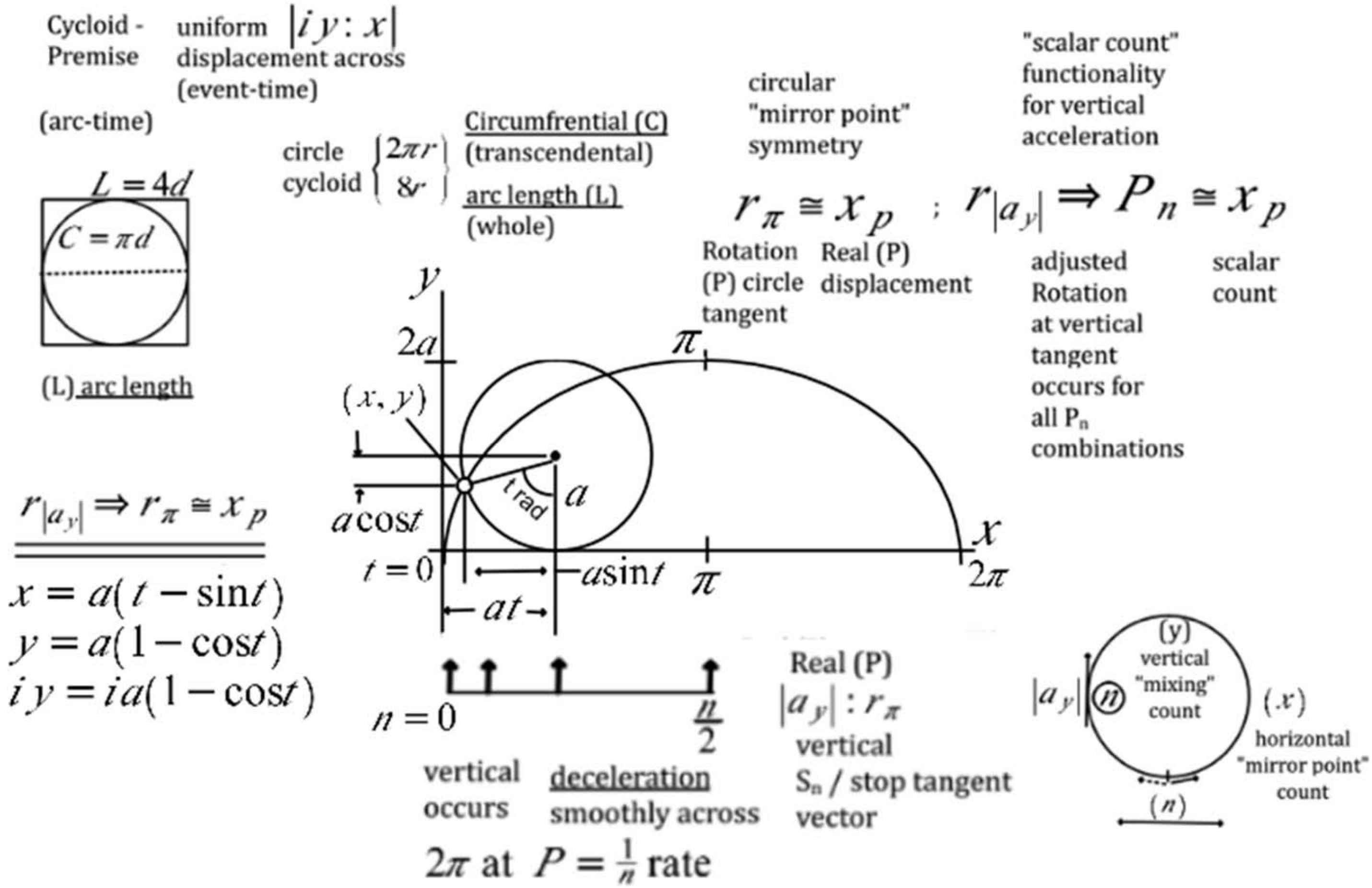
Multi Set P_ν Recession

Reflection across x-axis for identity matrix
(limit $x = y = 1$)~($P = 1$)

$$\begin{vmatrix} i & 0 \\ 0 & 1 \end{vmatrix} \quad \begin{vmatrix} i & 0 \\ 0 & 1 \end{vmatrix} \quad \begin{vmatrix} i & 0 \\ 0 & 1 \end{vmatrix} \quad \begin{vmatrix} i & 0 \\ 0 & 1 \end{vmatrix}$$

$$= \begin{vmatrix} -1 & 0 \\ 0 & 1 \end{vmatrix} \quad \frac{\text{AB=BA=}I}{\text{mirrored random links}} \Rightarrow \begin{vmatrix} x^2 & 0 \\ 0 & y^2 \end{vmatrix}$$

The commutative multiplicative inverse (I) establishes a new unit circle, thereby expanding sequenced events across the negative probability axis-x. $1 = {}'x^2 + y^2$; $1 = \cos^2 x + \sin^2 x$. The polar analog will result in $(1 - \cos x = \sin x)$. For the considered infinite limit condition, (P) negative unit circle $y = ix = y^2 = x^2$ yields $(1 - \cos x : x^2)$

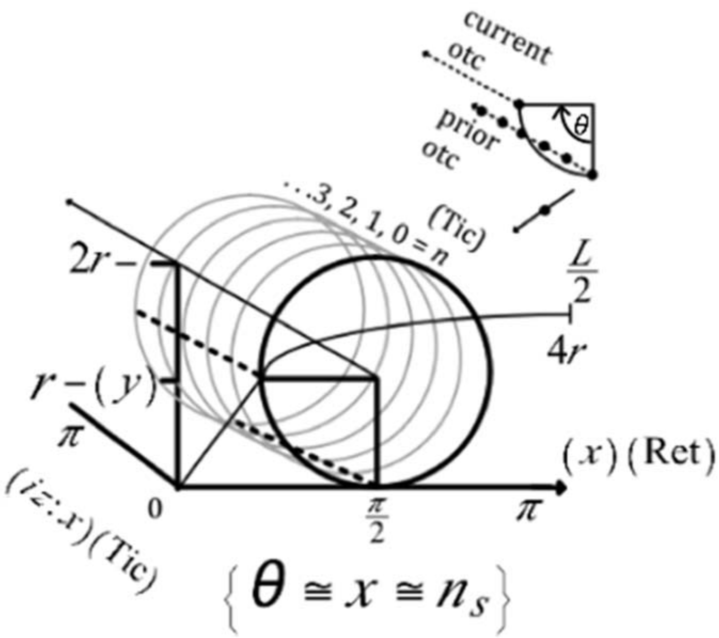


An established property of the Cycloid shape is the synchronous displacement of tangential items along the arc $\frac{L}{2}$ from 0 to $\frac{L}{2}$. All items along any position 0 to $\frac{L}{2}$ will displace to $\frac{L}{2}$ in an equivalent constant time (T) as long as a vertical, perpendicular and uniform acceleration exists along x effective upon (L).

$$\{x = \pi r \cong \frac{L}{2} \cong T = C\}$$

$$\{n^2 = \frac{S_T}{n} \cong L_{\mathrm{T}}\}$$

Each prior cycle will produce n arcs for the current domain of circular displacements (S). Each prior $\frac{1}{n}$ <u>start</u> results in n_s for all current stops. n_s produces one cycloid arc (L). The <u>total arcs</u> produced for the mean probability $(\bar{P})$ is n for each cycle, n^2 for all <u>prior cycles</u>. The uniform distribution of the start/stop component for each alternating cycle provides the <u>vertical</u> acceleration for the arc at $\theta = \frac{\pi}{2}$. The $iz : x$ axis provides the <u>horizontal</u> component into the negative time axis. The unifying rate of the arc across $\frac{L}{2} \cong x$ creates synchronization for variant sequences across time $\{iz : x \cong T\}$.

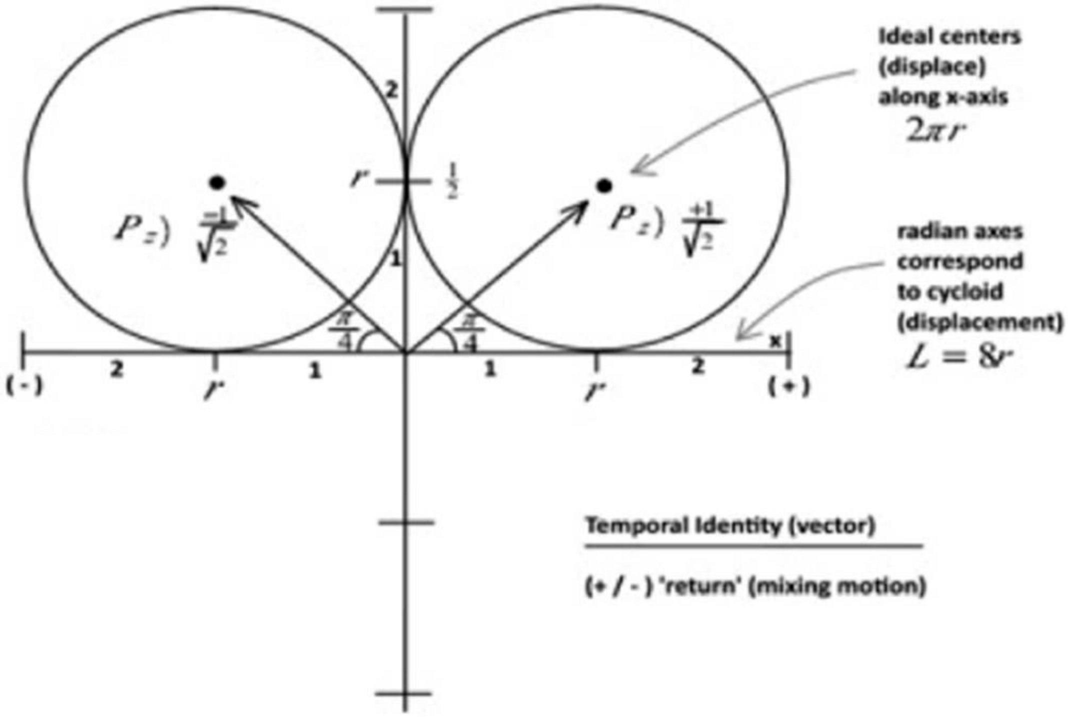


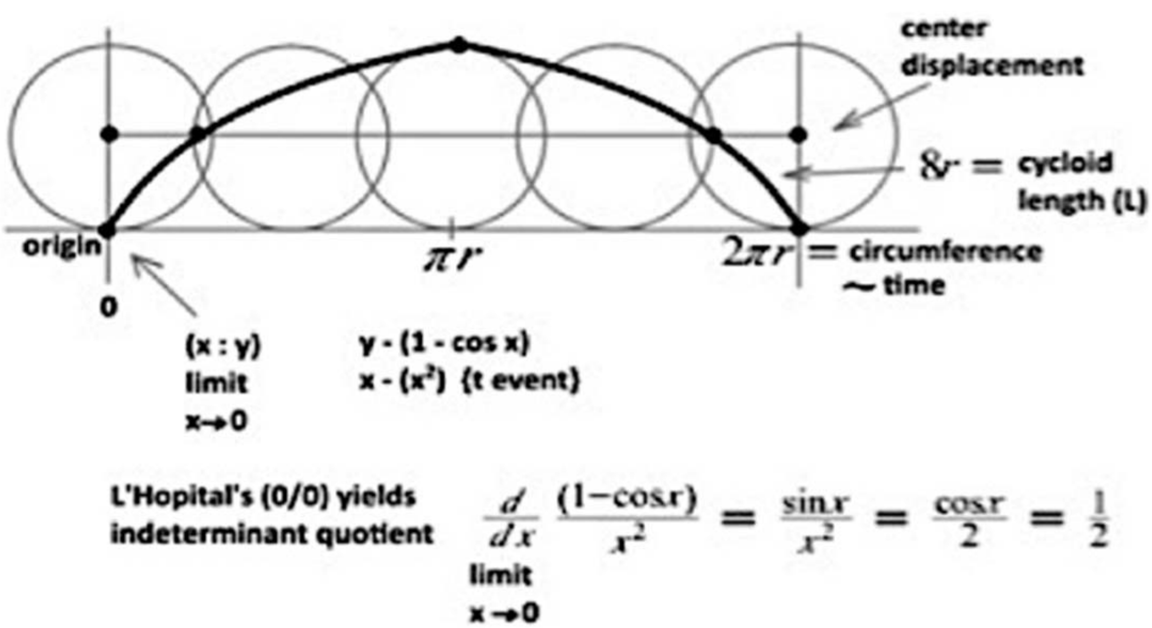
1. The arc-time circular displacement tends to the cycloid uniformity for $\theta = \frac{\pi}{2}$.
2. $1 - \cos\theta$ provides the vertical component for the arc
3. Cycloid synchronization per $(\bar{P})$ randomization is expressed by
$$f(x) = \frac{1 - \cos p}{p^2} \;\; ; \;\; \frac{x}{n} = p$$
4. L'Hôpital's second derivative yields the rational value $\lim_{p \to 0} f'(x) = \frac{1}{2}$
5. The P_v expression yields the limiting value of 2 for the first derivative.
6. The variant/invariant ratio yields Im : Re coordinates resulting in the identity $P_z = \left|\frac{1}{2} + i\,\frac{1}{2}\right| = i\,\frac{1}{\sqrt{2}}$

$(P_\infty = 1) \Rightarrow (\theta + \phi) = \frac{2\pi}{2} = \pi_x$
$z = r(\cos\theta + i\sin\theta)$; $w = s(\cos\phi + i\sin\phi)$
$\text{mod}\,(zw) = |zw| = r \cdot s = 1$
$\arg\,(zw) = (\theta + \phi) = \frac{2\pi}{2} = \pi$

$P = \frac{1}{n}$; outcome along circumference $P \Longrightarrow (n)$ displacements S for each prior : current outcome cycle. Each cycle stepping back in time reflects n^2 displacements. For all n cycles, n^3 displacements occur (S_T)

Mixing outcomes alternate between current and prior location stops and starts. The current OTC, or stop, becomes the next cycle start. The next OTC becomes the stop. The current (last-to-next) event results in a measurable displacement. All prior outcomes are reviewed as prior starts to the current stop. This temporal displacement is viewed to a distance of π, $\binom{n}{2}$ possible outcomes. The current last circumferential displacement (o – n) is considered Tic 1, Return n. All prior cycle starts are designated Tic1, 2, . . . n. The cycle starts at the zero angle position for each Tic : return value. The results are viewed in the : y , (Tic : return) graph called the "Halo".





A circle is an arc radially formed by a one-dimensional distance (r_1). The circle is expressed in two dimensions by the (x:y) scale ($2r_2$). The ($2r_2$) scale is considered congruent with the (x:y) axes. The perpendicular components of (r_1) are given by the value $\left(1/_2\right)$ of the (x:y) unit axes. A dimensional vector linking the radial center and the (x:y) axes origin is expressed by $\left(1/_{\sqrt{2}}\right)$.
The limit zero vertical component for the cycloid $(1 - \cos x)$ prescribes $8r$. For the horizontal component, the displaced motion corresponds to the (2nd) wheel. The perpendicular orientation produces the prescribed P_z) $1/_{\sqrt{2}}$ resultant vector. The common factor, (r) reflects (2r) for the cycloid arc and (r) for the wheel. This prescribes $\left(1/_2\right)$ value for the (initial condition) vector components. Notice the circular Ideal Centers and the Cycloid origin are 'linked' by the resultant $(-+)$ vector (P_z).

(S) Returns

50k sample outcomes were graphed using data from a roulette wheel. This allowed for events to be plotted in time : space

Current OTC

Prior OTC	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	00
0	0	20	1	24	5	28	9	32	13	36	17	33	14	21	2	25	6	29	10	12	31	8	27	4	23	16	35	18	37	15	34	11	30	7	26	3	22	19
1	18	0	19	4	23	8	27	12	31	16	35	13	32	1	20	5	24	9	18	30	11	26	7	22	3	34	15	36	17	33	14	29	10	25	6	21	2	37
2	37	19	0	23	4	27	8	31	12	35	16	32	13	20	1	24	5	28	9	11	30	7	26	3	22	15	34	17	36	14	33	10	29	6	21	2	21	18
3	14	34	15	0	19	4	23	8	27	12	31	9	28	35	16	1	20	5	24	26	7	22	3	18	37	30	11	32	13	29	10	25	6	21	2	14	36	33
4	33	15	84	19	0	23	4	27	8	31	12	28	9	16	35	20	1	24	5	7	26	3	22	37	18	11	30	13	32	10	25	6	25	2	21	36	17	4
5	10	30	11	34	15	0	19	4	23	8	27	5	24	31	12	35	16	1	20	22	3	18	37	14	33	26	7	28	9	25	6	21	2	17	36	13	32	29
6	29	11	30	15	34	19	0	23	4	27	8	24	5	12	31	16	35	20	1	3	22	37	18	33	14	7	26	9	28	6	25	2	21	36	17	32	13	10
7	6	26	7	30	11	34	15	0	19	4	23	1	20	27	8	31	12	35	16	18	37	14	33	10	29	22	3	24	5	21	2	17	36	13	32	9	28	25
8	25	7	26	11	30	15	34	19	0	23	4	20	1	8	27	12	31	16	35	37	18	33	14	29	10	3	22	5	24	5	21	2	17	32	13	28	9	6
9	2	22	3	26	7	30	11	34	15	0	19	35	16	23	4	27	8	31	12	14	33	10	29	6	25	18	37	20	1	17	36	13	32	9	28	5	24	21
10	21	3	22	7	26	11	30	15	34	19	0	16	35	4	23	8	27	12	31	33	14	29	10	25	6	37	18	1	20	36	17	32	13	28	9	24	5	2
11	5	25	6	29	10	33	14	37	18	3	22	0	19	26	7	30	11	34	15	17	36	13	32	9	28	21	2	23	4	20	1	16	35	12	31	8	27	24
12	24	6	25	10	29	14	33	18	37	22	3	19	0	7	26	11	30	15	34	36	17	32	13	28	9	2	21	4	23	1	20	35	16	31	12	27	8	5
13	17	37	8	3	22	7	26	11	30	15	34	12	31	0	19	4	23	8	27	29	10	25	6	21	2	33	14	35	16	32	13	28	9	24	5	20	1	36
14	36	18	37	22	3	26	7	30	11	0	15	31	12	19	0	23	4	27	8	10	29	6	25	2	21	14	33	16	35	13	32	9	28	5	24	1	20	17
15	13	33	14	37	18	3	22	7	26	11	30	8	27	34	15	0	19	4	23	25	6	21	2	17	36	29	10	31	12	28	9	24	5	20	1	16	35	32
16	32	14	33	18	37	22	3	26	7	30	11	27	8	15	34	19	0	23	4	6	25	2	21	36	17	10	29	12	31	9	28	5	24	1	20	35	16	13
17	9	29	10	33	14	37	18	3	22	7	26	4	23	30	11	34	15	0	19	21	2	17	36	13	32	25	6	27	8	24	5	20	1	16	35	12	31	28
18	28	10	29	14	33	18	37	22	3	26	7	23	4	11	30	15	34	19	0	2	21	36	17	32	13	6	25	8	27	5	24	1	20	35	16	31	12	9
19	26	8	27	12	31	16	35	20	1	24	5	21	2	9	28	13	32	17	36	0	19	34	15	30	11	4	23	6	25	3	22	37	18	33	14	29	10	7
20	7	27	8	31	12	35	16	1	20	5	24	2	21	28	9	32	13	36	17	19	0	15	34	11	30	23	4	25	6	22	3	18	37	14	33	10	29	25
21	30	12	31	16	35	20	1	24	5	28	9	25	6	13	32	17	36	21	2	4	23	0	19	34	15	8	27	10	29	7	26	3	22	37	18	33	14	11
22	11	31	12	35	16	1	20	5	24	9	28	6	25	32	13	36	17	2	21	23	4	19	0	15	32	27	8	29	10	26	7	23	3	18	37	14	33	30

⋮
0 all conversions
↓ not shown
00

T →

S ↑

RETURN CHART

T : S displacement

Time trace variant nodes

The circumferential displacements are provided for each random outcome. The incremental distance counts are calculated from the last and all prior event origins to the given target outcome. The last event to the given is identified by the time : space value for tic 1. Two prior events to the target for tic 2, etc. Variant rate nodal peaks are identified uniformly in the "Halo" graph for explicit time : space coordinate locations.

OTC	**32 43** Tic 1	Tic 2	Tic 3	**29** Tic 4	**28** Tic 5	Tic 6	Tic 7	**25** Tic 8	**24** Tic 9	Tic 10	Tic 11	**20** Tic 12	Tic 13	Tic 14	Tic 15	Tic 16	Tic 17	Tic 18	Tic 19	Tic 20
33																				
35	34																			
15	2	18																		
1	33	17	13																	
20	11	6	28	24																
31	18	29	24	8	4															
14	29	9	20	15	37	33														
31	9	0	18	29	24	8	4													
21	35	6	35	15	26	21	5	1												
5	20	17	26	17	35	8	3	25	21											
10	27	9	6	5	6	24	35	30	14	10										
29	36	25	7	4	13	4	22	33	28	12	8									
36	7	5	32	14	11	20	11	29	2	35	19	15								
25	32	1	37	26	8	5	14	5	23	34	29	13	9							
32	14	8	15	13	2	22	19	28	19	37	10	5	27	23						
22	35	11	5	12	10	37	19	16	25	16	34	7	2	24	20					
2	12	9	23	17	24	22	11	31	28	37	28	8	19	14	36	32				
29	14	26	23	37	31	0	36	25	7	4	13	4	22	33	28	12	8			
11	18	32	6	3	17	11	18	16	5	25	22	31	22	2	13	8	30	26		
19	17	35	11	23	20	34	28	35	33	22	4	1	10	1	19	30	25	9	5	
14	29	7	25	1	13	10	24	18	25	23	12	31	29	0	29	9	20	15	37	33
30	32	22	1	19	33	7	4	18	12	19	17	6	26	23	32	23	3	14	9	31
37	23	7	17	24	4	18	30	27	3	35	4	2	29	11	8	17	8	26	37	32
31	30	15	9	37	16	34	10	22	19	33	27	34	32	21	3	0	9	3	18	29
14	29	21	6	0	28	7	25	1	13	10	24	18	25	23	12	32	29	0	29	9
8	11	2	32	17	11	1	18	36	12	24	21	35	29	36	34	23	5	2	11	2
35	28	1	30	22	7	1	29	8	26	2	14	11	25	19	26	24	13	33	30	1
1	17	7	18	9	1	24	18	8	25	5	19	31	28	4	36	5	3	30	12	9
14	20	37	27	0	29	21	6	0	28	7	25	1	13	10	24	18	25	23	12	32
16	4	24	3	31	4	33	25	10	4	32	11	29	5	17	14	28	22	29	27	16
16	0	4	24	3	31	4	33	25	10	4	32	11	29	5	17	14	28	22	29	27
8	7	7	11	31	10	0	11	2	32	17	11	1	18	36	12	24	21	35	29	36
32	17	24	24	28	10	27	17	28	19	11	34	28	18	35	15	29	3	0	14	8
21	16	33	2	2	6	26	5	33	6	35	27	12	6	34	13	31	7	19	16	30
6	1	17	34	3	3	7	27	6	34	7	36	28	13	7	35	14	32	8	20	17
25	7	8	24	3	10	10	14	34	13	3	14	5	35	20	14	4	21	1	15	27
10	1	8	9	25	4	11	11	15	35	14	4	15	6	36	21	15	5	22	2	16
33	28	29	36	37	15	32	1	1	5	25	4	32	5	34	26	11	5	33	12	30
33	0	28	29	36	37	15	32	1	1	5	25	4	32	5	34	26	11	5	33	12
15	18	18	8	9	16	17	33	12	19	19	23	5	22	12	23	14	6	29	23	13
19	25	5	5	33	34	3	4	20	37	6	6	10	30	9	37	10	1	31	16	10
16	32	19	37	37	27	28	35	36	14	31	0	0	4	24	3	31	4	33	25	10
4	37	31	18	36	36	26	27	34	35	13	30	37	37	3	23	2	30	3	32	24
29	10	9	3	28	8	8	36	37	6	7	23	2	9	9	13	33	12	2	13	4
24	8	18	17	11	36	16	16	6	7	14	15	31	10	17	17	21	3	20	10	21
9	13	21	31	30	24	11	29	29	19	20	27	28	6	23	30	30	34	16	33	23

(otc) physical

Column

Time / Space

RR (t:s) Halo

$U_o)50k$

4.15.9
Total H Mod
12.25.11

7 files (277)

$1/\infty$ (— values) 4.5 6.36 9.0 12.78 $\{ (1/2\,Pn - 1) \prod_1^\infty P_z^n \}$

Physical bias

RTN	H0	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12	H13	H14	H15	H16	H17	H18	H19	H20
0	1344	1401	1400	1316	1275	1358	1355	1365	1303	1323	1351	1262	1353	1375	1345	1347	1368	1330	1386	1280	1398
1	1401	1363	1337	1376	1282	1213	1214	1359	1317	1275	1283	1331	1332	1331	1254	1311	1296	1305	1354	1370	1330
2	1301	1265	1277	1282	1300	1355	1302	1344	1317	1339	1300	1297	1344	1350	1301	1319	1304	1363	1269	1256	1283
3	1284	1324	1311	1351	1293	1334	1333	1322	1346	1243	1237	1344	1341	1293	1368	1305	1366	1327	1356	1333	1373
4	1246	1361	1317	1330	1310	1329	1338	1297	1330	1363	1254	1292	1261	1272	1257	1222	1299	1307	1279	1292	1349
5	1228	1295	1284	1390	1390	1355	1262	1329	1259	1381	1343	1317	1341	1274	1403	1254	1260	1306	1383	1303	1351
6	1263	1356	1353	1371	1327	1268	1300	1330	1336	1327	1333	1285	1309	1337	1309	1375	1284	1336	1250	1335	1300
7	1246	1329	1262	1351	1328	1293	1322	1315	1252	1325	1360	1361	1298	1346	1303	1305	1359	1342	1321	1339	1338
8	1366	1282	1252	1210	1322	1334	1334	1306	1263	1267	1360	1306	1273	1336	1263	1312	1231	1331	1313	1258	1229
9	1341	1332	1322	1366	1290	1298	1339	1348	1329	1301	1330	1297	1352	1276	1323	1313	1410	1254	1253	1331	1308
10	1380	1271	1314	1343	1320	1310	1253	1246	1268	1265	1346	1281	1290	1333	1318	1258	1293	1251	1225	1293	1281
11	1459	1304	1287	1308	1265	1345	1286	1324	1363	1303	1290	1308	1341	1306	1367	1309	1299	1390	1323	1212	1330
12	1250	1315	1328	1264	1332	1269	1371	1320	1342	1336	1346	1274	1314	1333	1323	1341	1308	1328	1256	1309	1324
13	1406	1329	1342	1337	1289	1311	1324	1307	1300	1316	1346	1347	1342	1351	1296	1350	1264	1324	1304	1303	1339
14	1415	1298	1322	1312	1202	1327	1317	1238	1285	1310	1304	1269	1329	1284	1339	1338	1357	1386	1266	1333	1295
15	1299	1268	1322	1276	1347	1308	1355	1278	1294	1331	1330	1270	1334	1316	1308	1279	1392	1308	1274	1321	1317
16	1263	1309	1323	1318	1317	1273	1304	1262	1316	1353	1230	1289	1393	1357	1316	1333	1316	1248	1292	1342	1376
17	1429	1303	1356	1320	1269	1367	1329	1246	1270	1275	1301	1328	1339	1288	1308	1313	1225	1275	1269	1322	1255
18	1399	1286	1365	1336	1321	1206	1275	1313	1311	1362	1315	1339	1335	1355	1325	1245	1246	1344	1378	1375	1322
19	1268	1329	1332	1301	1328	1316	1330	1296	1397	1345	1348	1235	1328	1270	1296	1276	1305	1384	1372	1315	1360
20	1341	1313	1377	1385	1313	1331	1341	1377	1306	1379	1339	1343	1302	1383	1311	1349	1290	1372	1343	1369	1327
21	1295	1303	1274	1322	1367	1295	1278	1293	1362	1345	1362	1385	1280	1278	1420	1314	1312	1325	1316	1329	1313
22	1384	1351	1384	1315	1281	1343	1341	1336	1293	1355	1304	1332	1310	1372	1273	1372	1414	1330	1289	1317	1334
23	1300	1260	1294	1282	1344	1256	1269	1342	1325	1346	1297	1338	1309	1290	1265	1314	1384	1359	1332	1279	1330
24	1339	1293	1288	1356	1289	1330	1390	1337	1319	1381	1347	1336	1277	1350	1332	1344	1329	1327	1364	1265	1307
25	1294	1280	1275	1281	1287	1360	1333	1238	1391	1283	1331	1314	1275	1332	1270	1307	1369	1230	1353	1352	1211
26	1251	1327	1299	1291	1347	1366	1285	1273	1315	1303	1264	1296	1328	1309	1367	1326	1305	1222	1337	1273	1264
27	1329	1320	1353	1301	1298	1301	1302	1323	1326	1283	1345	1332	1325	1340	1312	1398	1300	1314	1295	1407	1253
28	1314	1269	1327	1330	1248	1368	1352	1294	1297	1374	1274	1334	1357	1284	1348	1334	1244	1283	1308	1301	1319
29	1438	1299	1390	1374	1398	1312	1359	1339	1276	1279	1327	1285	1242	1340	1341	1344	1288	1306	1365	1370	1293
30	1244	1371	1341	1237	1358	1282	1294	1271	1292	1284	1336	1333	1366	1194	1317	1302	1323	1322	1396	1336	1285
31	1404	1321	1293	1263	1304	1308	1287	1428	1363	1340	1276	1330	1210	1324	1268	1333	1330	1389	1335	1348	1274
32	1249	1401	1256	1342	1320	1357	1345	1316	1363	1317	1280	1275	1294	1291	1327	1347	1285	1278	1333	1353	1235
33	1283	1338	1287	1263	1317	1341	1416	1359	1300	1244	1286	1374	1340	1380	1262	1323	1383	1323	1236	1341	1371
34	1240	1341	1300	1280	1354	1323	1295	1337	1287	1276	1259	1303	1322	1307	1326	1289	1321	1223	1347	1217	1330
35	1258	1324	1301	1389	1400	1306	1278	1380	1384	1298	1337	1332	1320	1288	1330	1300	1272	1269	1371	1338	1319
36	1410	1289	1260	1297	1343	1338	1328	1301	1316	1282	1392	1387	1309	1315	1281	1326	1331	1375	1324	1321	1349
37	1315	1280	1291	1282	1325	1314	1265	1312	1285	1282	1337	1338	1274	1240	1331	1274	1335	1313	1232	1259	1328
TOT	50277	50000	49916	49998	50000	50000	50001	50001	49998	50001	50000	49999	49999	50000	50003	50001	49997	49999	49999	49997	50000

$\pi n(1 + P_z)$

19 + 13.43
= <u>32.43</u>

Time Trace Nodes
45° identity (t : s)
2x standard deviation

(?)
P_z^3 is perturbed by tumbler bas

*Node is displaced to adjacent time nodes.
Or,
i(odd) } i coefficient at P_z^3 results in reverse value; but refraction not expected.

∴ cause = bias
$N_2\ \mu)$ 1379.5
$vi)$ 1.0484;
near expected variance value for single $P_+)$ node

*not to disregard idea of exact concavity

Bias – $\mu)$ 1315.79 $\sigma N_8 = 81.9$; $\Delta = 1379.69$

11@15,525 1388.89 $\sigma N_6 = 80.7$; $\Delta = 1396.5$

$\mu)$1411.36

$vi)$ 1.0726 $\sigma N_5 = 79.6$; $\Delta = 1395.4$; $\Delta/\mu = 1.0605$

$* \pi_n = \frac{1}{2} Pn = 19$ <u>2 x σ = 2x 39.694</u> 2 times (variant) standard deviation = 79.39

$\frac{43}{760} = \underline{0.0566}$ 760 Nodes , $P_v)\underline{0.05058}$

59,840, $43V_{\mathrm{Hi}}\ \mu)$ 1391.63 , calc)1382.34 , 1.0067

$vi)$ <u>1.0576</u>

—Summary—
As described in Th 3.0, the limit condition for the x, iy-complex plane allows for a mirrored equivalence across the $\frac{\pi}{4}$ identity argument, if the radian P value equals 1 for both axes. $(x = iy = 1)\sim(P = 1)$. Consider $(\pi\sim n\sim\infty)$.

For $\left(\frac{1}{n} = P\right)$, this condition can be seen as possible for events stacking across time for outcomes = infinity. The given condition for $x = P = 1$, for the radian measure limit $\pi \to 0$, assumes $P = 1$ for the outcome limit $n \to 1$. The condition for radian $\frac{\pi}{2} = P = 0$ is considered for limit $n \to \infty$.

If the system tends to uniformity, for the $\frac{\pi}{4}$ identity argument, the radian displacement S will connect outcomes into the negative events per outcome – x-axis. This prescribes $\left(n \cdot \frac{1}{n}\right) \sim (P = 1)$. The negative time trace identity present in the halo graph, 2 x σ nodes, matches the time : space axis parameters for { $|P_z| = \frac{1}{\sqrt{2}}$ vector} multiplying factors.

—Thought Experiments—
If random events are manifestly synchronized across negative time, i.e. the multiplicative inverse $(x{:}\ iy)$-matrix, then a real and plausibly physical continuum of positive/negative time exists. If a negative time wave form is found to describe matter, Variance Theory will require a matter : energy leak. If a push in negative time results in attraction, is this gravity? Are slowly moving galaxies experiencing more trans-time gravity waves? Perhaps the observed extra centripetal force in some galactic spirals does not require dark matter.

The old wives tale prescribes lightning as never striking the same place twice. Could the intuition of stubbing your toe twice in the same day reflect some truth? The research demonstrates that low probability events tend to recur at a variantly high rate for given contained randomizing systems.

The conundrum of the miraculously complex and minute DNA molecule may involve the variant binomial phenomenon; $A \cdot T, G \cdot C$. Is the molecule evolving with an inherent proclivity for certain combinations? Does the blue print for life have a mind of its own, precluding much of the so-called natural selection?

Consciousness might be considered little more than data collection and processing. Are we nothing more than self-deceived computers? If the complex lipid structure of neurons is participating in a natural property of time-slip connectivity, self-awareness takes on a new meaning.

Einstein's Relativity identified static light velocity as dependent upon the observer's positive time dilation. If random systems are experiencing a continuum of negative time synchronicity, then motion and mixing itself is establishing a domain of immutable information along a negative : positive time axis.

Many possibilities currently excluded from the academic dogma appear quite probable.