

Time Measured in Events Does Not Line Up with Time Measured on a Clock

— The same four series agree at **1702--1968** seconds on the clock and spread over **1387--3777** in events — the end-to-end ratios are **1.1563** against **2.7231**, a difference in spread of **2.3551** — [Paper 427]

Yuuki YAMAGISHI (山岸 勇輝)

Yamagishi Complexity Torus Lab, Japan

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— *From thinking to syncing.* —

Abstract

The same happenings can be measured on a clock or by counting how many times something occurred. This paper shows that the two do not line up—and that which one is used changes what “the same length” means. No new theorem or law is claimed. First, this is the core of the paper. The same four series agree at **1702--1968** seconds on the clock and spread over **1387--3777** in events (Section 2). Second, the end-to-end ratios are **1.1563** against **2.7231** (Section 2). Third, the ratio of spreads is **2.3551** (Section 2). Fourth, the range in events covers the range on the clock from both ends ($1387 < 1702$ and $3777 > 1968$) (Section 2). Fifth, synthetically, densities from 0.7 to 2.1 spread event time by **3.0**, and equal densities return the ratio to exactly 1 (Section 3). Sixth, the separator is what is counted to make one interval (Section 4).

Scope of this paper (scope note): No new theorem or law is claimed—event time, time change, and subordinated processes are all standard. Neither clock is declared correct—neither the clock nor the event count is called right; the question decides. No particular field is discussed—the figures come from observations of a time series, but neither the subject nor any method is. The theory of time change is not developed—the general theory of subordinated processes, and the claim that a time change brings returns closer to normality, are not treated. The origin of the densities is not discussed—why event density differs between series is not the subject. No prediction is claimed—which clock gives better forecasts is not discussed. Relation to earlier papers: Paper 82 read time as a renko chart and separated coordinate time, proper time and event time as distinct roots—this paper adds to that framework an independent observation of four series under two yardsticks. Paper 424 showed that dividing turns a move in the denominator into an event—there the denominator changed with the situation; here time itself changes with the yardstick. Paper 300 showed that common root and distinct root can be decided—“clock time” and “event time” are distinct roots by that criterion. Paper 412 showed that “nearest” is not defined until the distance is—here “the same length” is not defined until time is. What is added is measuring four series under two yardsticks and giving the end-to-end ratios, putting the ratio of spreads at 2.3551, showing that the event range covers the clock range, confirming synthetically that differences in density produce the spread, placing equal densities as the other side of the boundary, and placing the separator at “what is counted to make one interval”.

1. Notation and the Question

Setting: Count one “event” each time a change of a fixed size occurs in a series. Define one interval in two ways.

$$\text{Clock : } \Delta t = T \text{ seconds} \quad \text{Events : } \Delta N = N \text{ events}$$

With an event density λ (events per second), one interval in events corresponds to N/λ seconds.

Observation 1.1

The clock does not depend on the subject. A second is a second in every series—which makes comparison easy.

Observation 1.2

Events do depend on the subject. In an active series they accumulate faster—so “ N events” takes a different amount of time.

Question: Measure the same four series both ways. How far apart are the answers.

2. They Agree on the Clock and Spread in Events

Computation 2.1: For the same four series, give the seconds taken by one interval under each yardstick.

Yardstick	Range [s]	End-to-end ratio
Clock	1702 -- 1968	1.1563
Events	1387 -- 3777	2.7231

Observation 2.2

On the clock the four agree. An end-to-end ratio of **1.1563**—about fifteen per cent apart.

Observation 2.3

In events they do not. An end-to-end ratio of **2.7231**—the fastest and the slowest differ by a factor of 2.7.

Computation 2.4: Take the ratio of the spreads.

$$\frac{2.7231}{1.1563} = 2.3551$$

Observation 2.5

Same subject, same period. Only the definition of an interval changed—and “the four agree” became “the four are scattered”.

Observation 2.6

The range in events covers the range on the clock from both ends. $1387 < 1702$ and $3777 > 1968$ —not merely shifted but extending past it.

Observation 2.7

If the two measured the same thing, the ratios would agree. They differ by 1.5669—and that disagreement is the number that says they are different quantities.

3. Differences in Density Produce the Spread

Computation 3.1: Check synthetically. Give four series event densities of 1.0, 1.4, 0.7 and 2.1, and take the seconds for $N = 1000$ events.

Series	Density	One interval [s]
First	1.0	1000
Second	1.4	714
Third	0.7	1429
Fourth	2.1	476

The end-to-end ratio is **3.0**.

Observation 3.2

It reproduces the ratio of densities. $2.1/0.7 = 3.0$ —the spread in event time is the spread in density.

Observation 3.3

Place the other side of the boundary. Make the densities equal and the ratio returns to exactly 1—showing that density alone produces the spread.

Observation 3.4

So the measured 2.7231 means the four series differ in event density by about 2.7. That they agreed on the clock is only because the clock does not depend on the subject—their agreement carried no information about them.

4. The Separator

The separator: what is counted to make one interval.

Observation 4.1

The clock is imposed from outside. It advances while the subject does nothing—so quiet stretches and busy ones come out the same length.

Observation 4.2

Events arise from inside. They do not advance while the subject is still—so quiet stretches come out short and busy ones long.

Observation 4.3

These are distinct roots by the criterion of Paper 300. Both are called “one interval”—one an external period, one an internal count.

Observation 4.4

Paper 82 had already separated coordinate time, proper time and event time. This paper adds numbers from four series under two yardsticks—not an argument from within the framework but an independent observation from outside.

Observation 4.5

Neither is the correct one. To compare what happened at the same moment, use the clock—to compare what has undergone the same number of happenings, use events. The question decides the yardstick.

Observation 4.6

To be honest—these figures belong to four series only. No claim is made that other subjects give the same ratio—what does not move is that there is no reason for the two yardsticks to agree.

Observation 4.7

One last thing—without saying which time was used, “the same length” means nothing. On the clock they agree; in events they scatter—the same record yields opposite conclusions.

5. Roll Call and Closing

1. 1702--1968 s on the clock (Computation 2.1): **the four agree.**
2. 1387--3777 s in events (Computation 2.1): **they scatter.**
3. End-to-end ratio **1.1563** (Observation 2.2): **the clock.**
4. End-to-end ratio **2.7231** (Observation 2.3): **events.**
5. Ratio of spreads **2.3551** (Computation 2.4): **the yardsticks differ.**
6. $1387 < 1702$ and $3777 > 1968$ (Observation 2.6): **covered from both ends.**
7. The ratios differ by **1.5669** (Observation 2.7): **not the same quantity.**
8. The synthetic ratio is **3.0** (Computation 3.1): **the ratio of densities.**
9. Equal densities give a ratio of **1** (Observation 3.3): **the other side of the boundary.**
10. The separator is external period or internal count (Observation 4.3): **distinct roots by Paper 300.**

Closing: The same happenings can be measured on a clock or by counting how many times something occurred—the clock does not depend on the subject, so a second is a second in every series and comparison is easy. Events do depend on the subject, accumulating faster in an active series, so “ N events” takes a different amount of time. Measure the same four series both ways and the answers come out opposite—on the clock they occupy 1702--1968 seconds with an end-to-end ratio of **1.1563**, about fifteen per cent apart, and the four agree. In events they

occupy 1387--3777 seconds with an end-to-end ratio of **2.7231**, the fastest and slowest differing by a factor of 2.7. The ratio of spreads is **2.3551**, with the same subject and the same period; only the definition of an interval changed. The range in events covers the range on the clock from both ends ($1387 < 1702$ and $3777 > 1968$), not merely shifted but extending past it. If the two measured the same thing the ratios would agree, and their difference of **1.5669** is the number that says they do not. The spread comes from density—giving four synthetic series densities of 1.0, 1.4, 0.7 and 2.1 makes one interval take 1000, 714, 1429 and 476 seconds, and the end-to-end ratio **3.0** is exactly the ratio of densities $2.1/0.7$. Make the densities equal and the ratio returns to exactly **1**, showing that density alone produces the spread. So the measured **2.7231** means the four differ in event density by about 2.7, and their agreement on the clock is only because the clock does not depend on the subject—that agreement carried no information about them. One thing separates them—what is counted to make one interval. The clock is imposed from outside and advances while the subject does nothing, so quiet stretches and busy ones come out the same length. Events arise from inside and do not advance while the subject is still, so quiet stretches come out short and busy ones long. They are distinct roots by the criterion of Paper 300, one an external period and one an internal count. Paper 82 had already separated coordinate time, proper time and event time; this paper adds numbers from four series under two yardsticks, an independent observation from outside the framework. To be honest—these figures belong to four series only, and no claim is made that other subjects give the same ratio. What does not move is that there is no reason for the two yardsticks to agree. One last thing—without saying which time was used, “the same length” means nothing: on the clock they agree, in events they scatter, and the same record yields opposite conclusions. Neither is the correct one—to compare what happened at the same moment use the clock, to compare what has undergone the same number of happenings use events, and the question decides the yardstick.

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Yuuki YAMAGISHI (山岸 勇輝)

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