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RESEARCH





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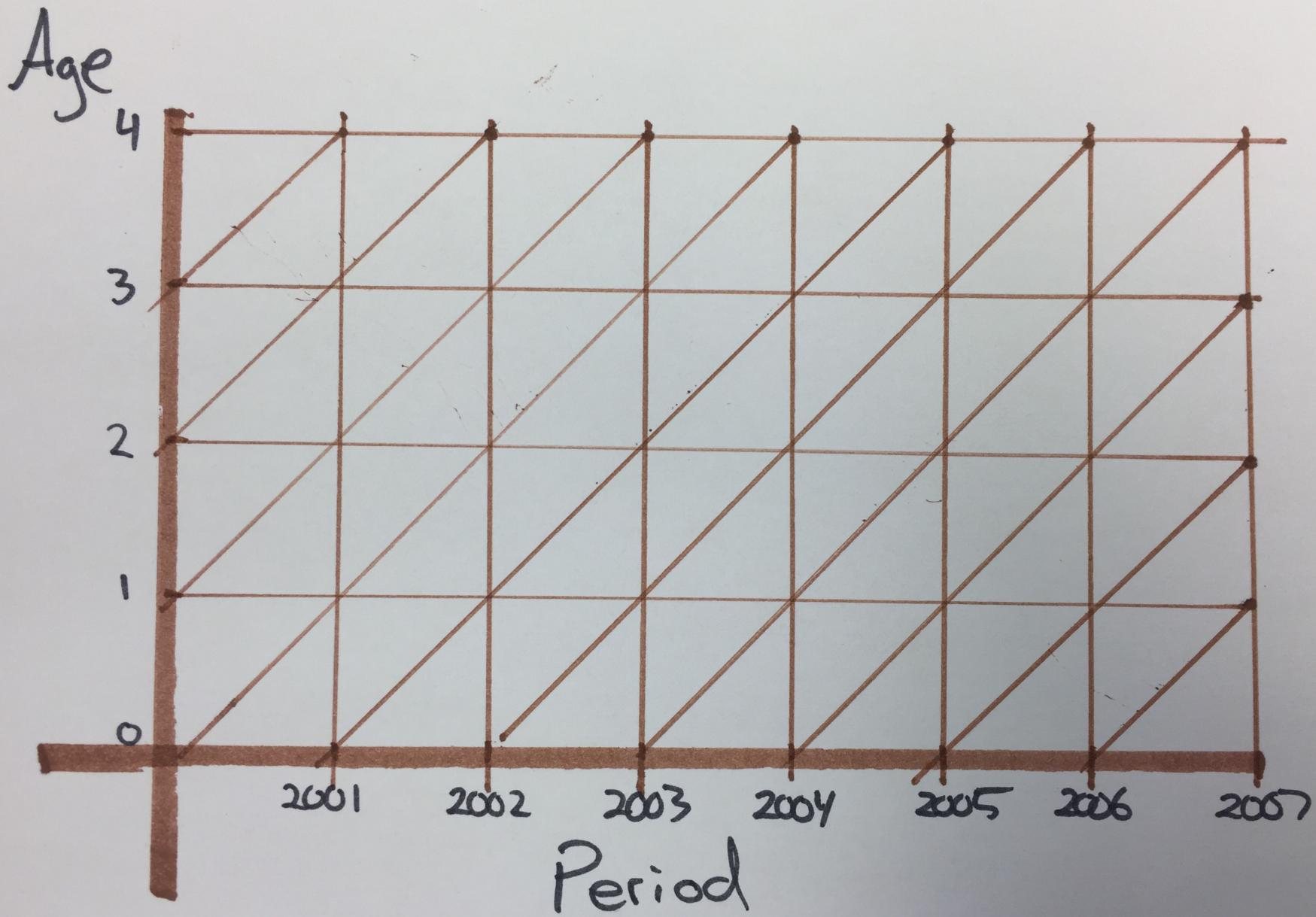
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Properties of generalized Lexis identities

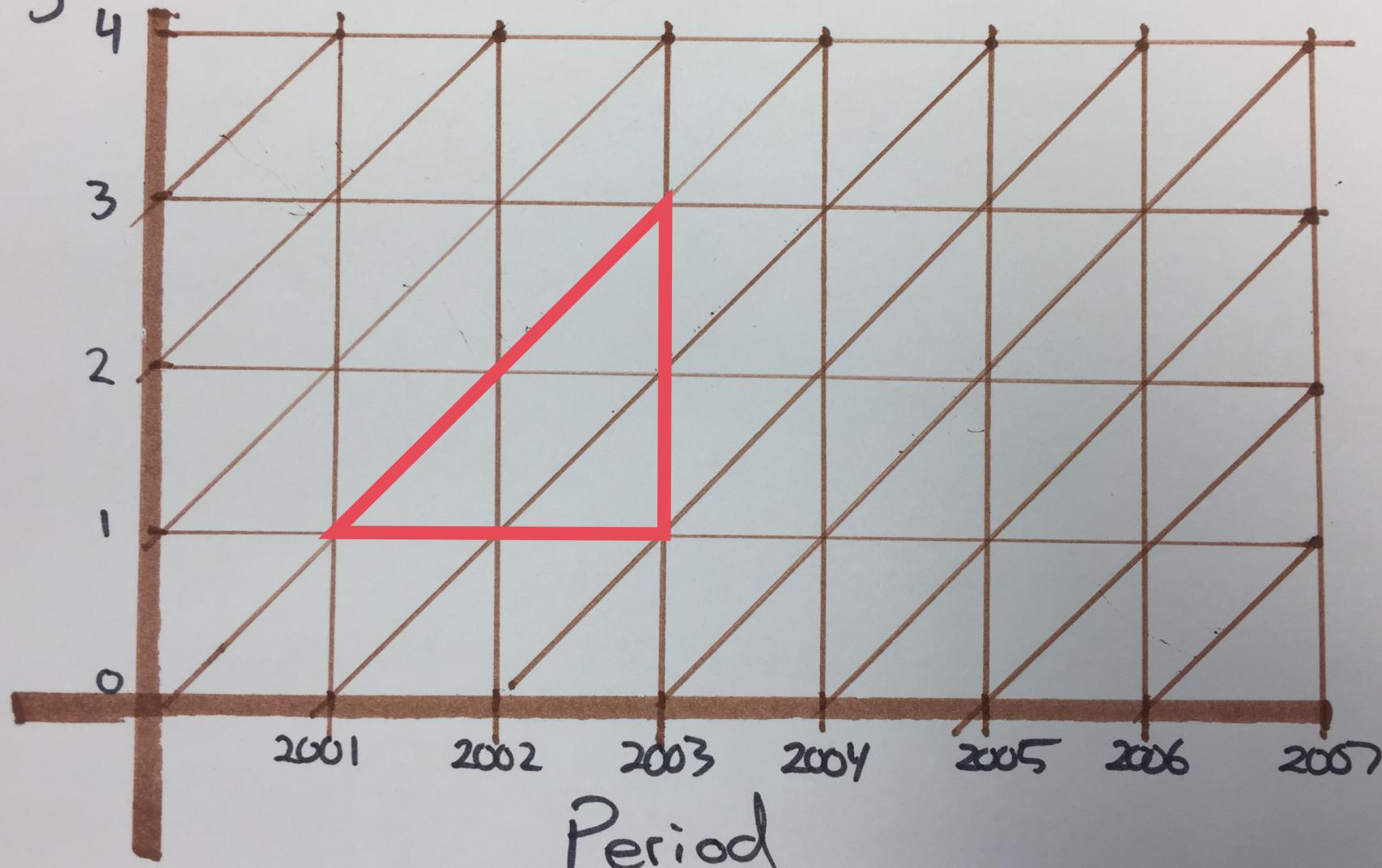
**Tim Riffe
Jonas Schöley**

Objective

We describe the construction and reflect on the composition and identification of higher order temporal identities.

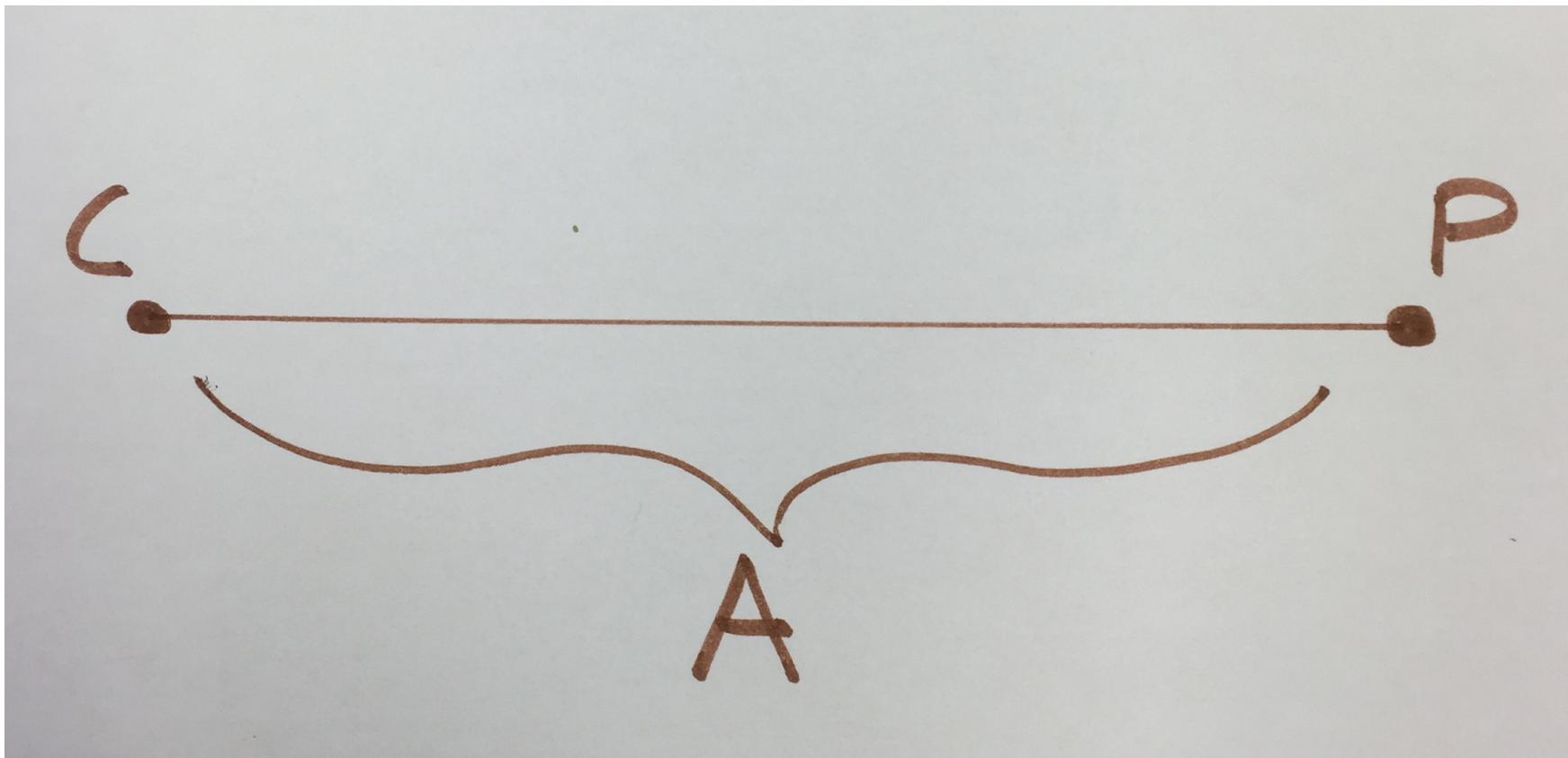


Age



APC identity

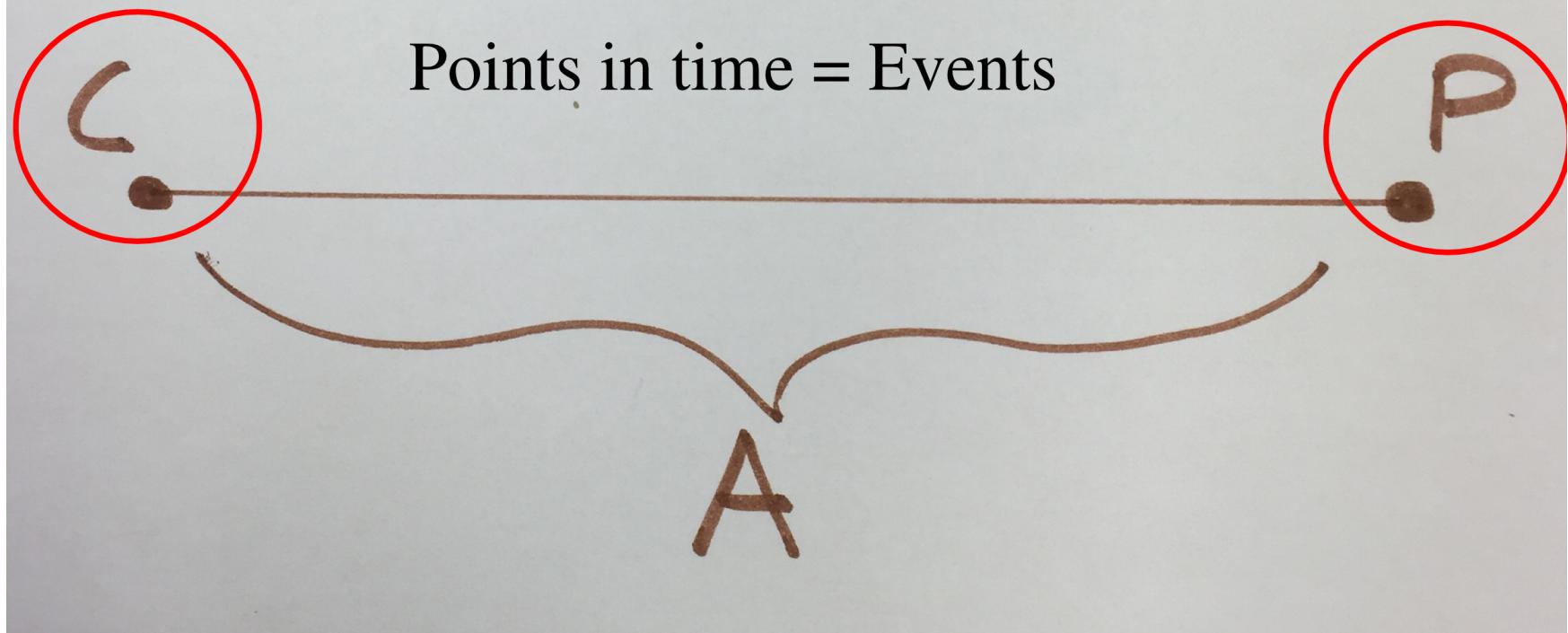
$$P - C = A$$



APC identity

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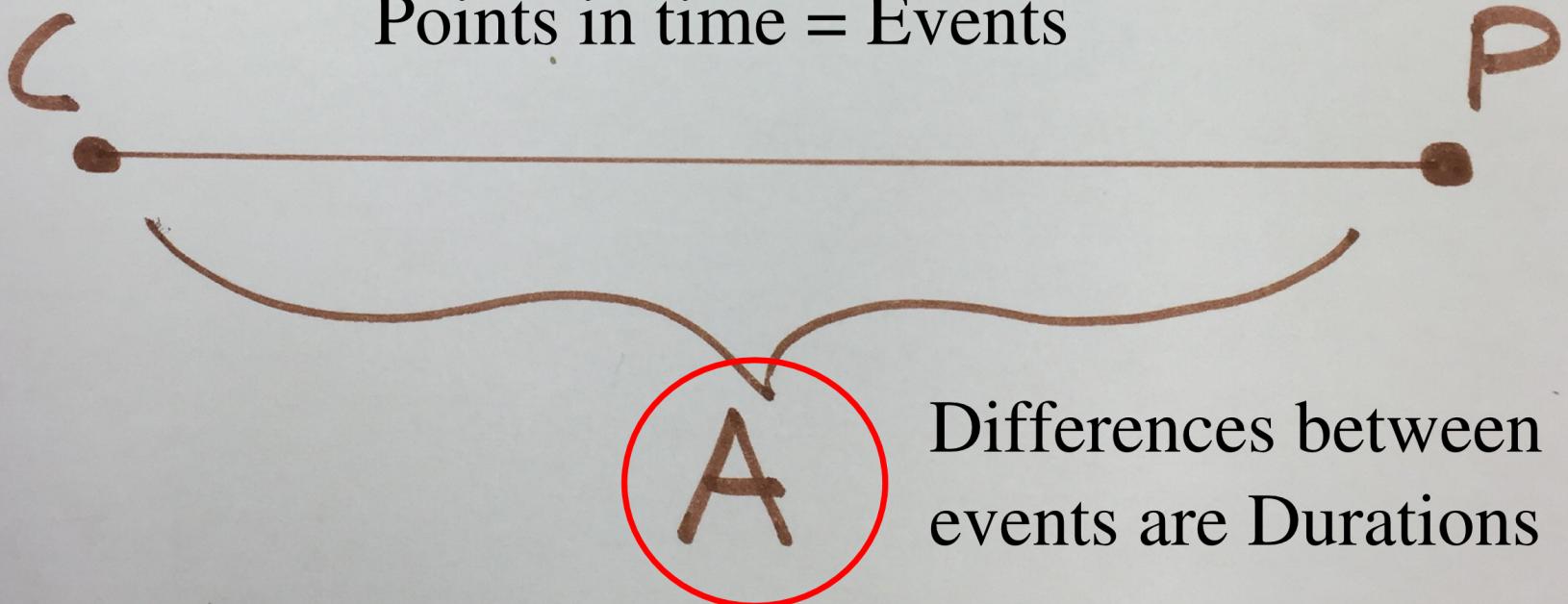
Points in time = Events



APC identity

$$P - C = A$$

Points in time = Events



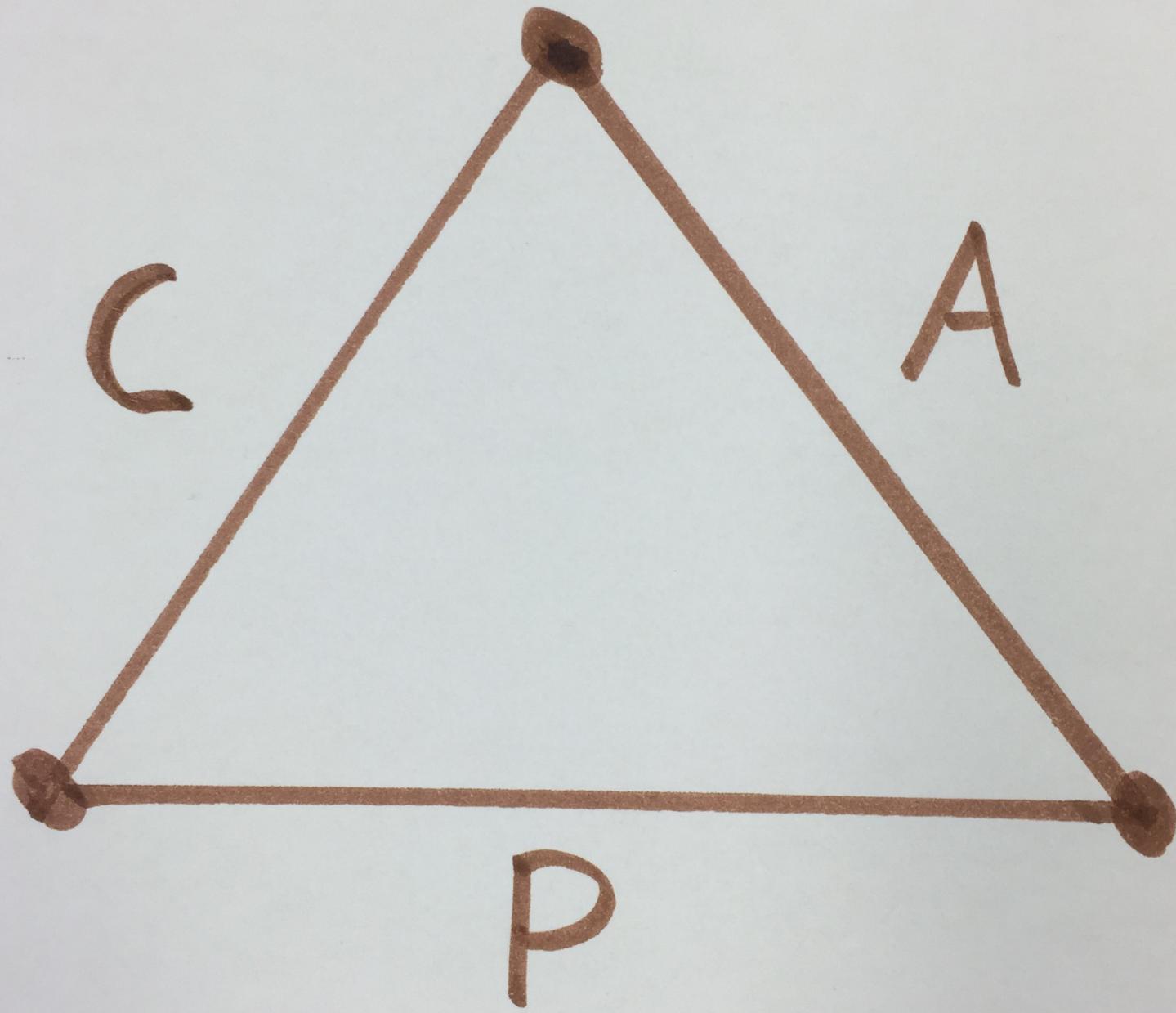
Differences between
events are Durations

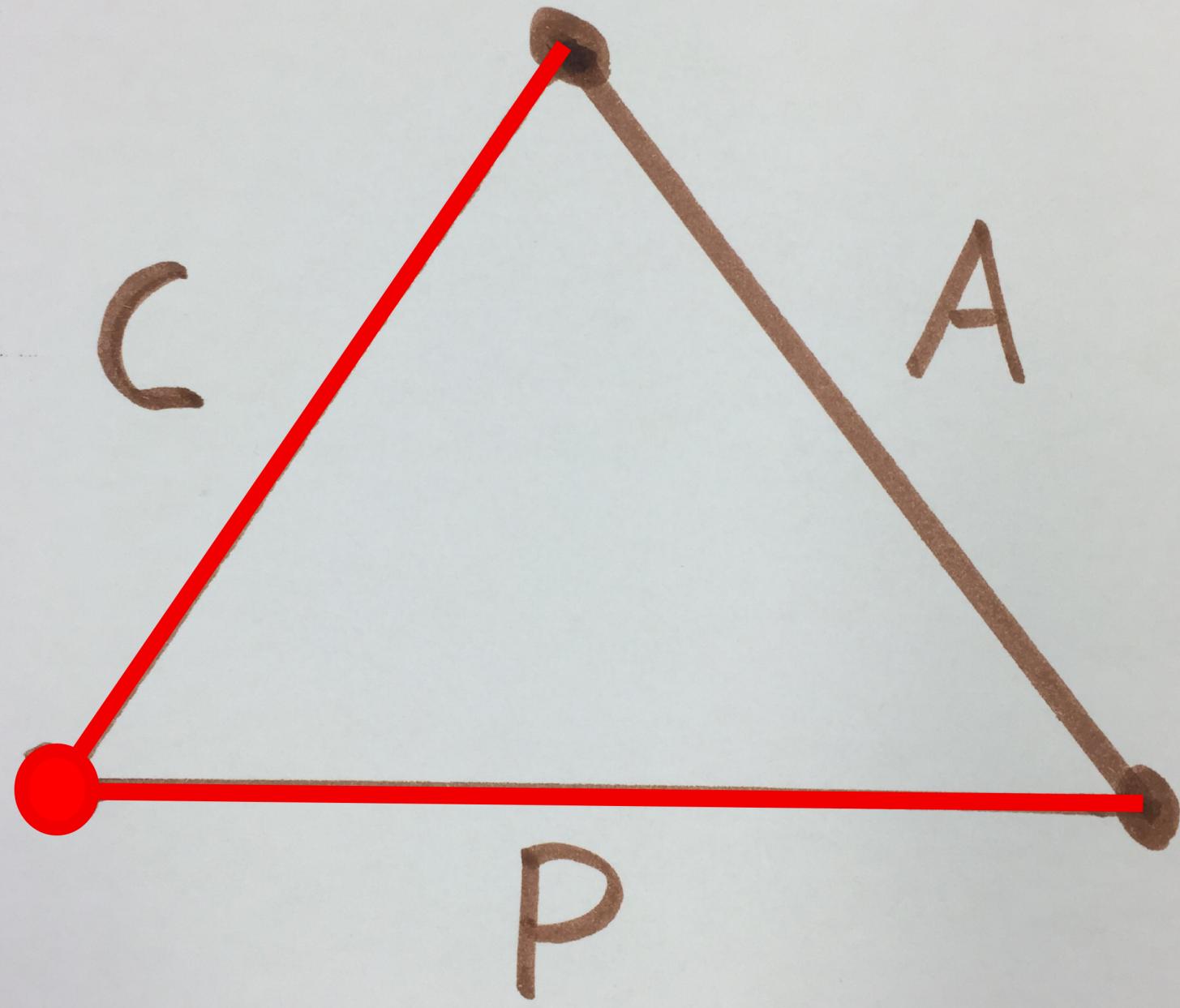
Events and durations are key.

Events may be anchored or scale

Durations may be either scaling or fixed

Scaling time measures move along a lifeline, whereas anchored events and fixed durations are lifelong attributes.





Some categories

- C is an anchored event
- P scales over a lifeline
 - but any given P is anchored, so it's like an event.
 - A is a function of P, so it scales along lifelines too.

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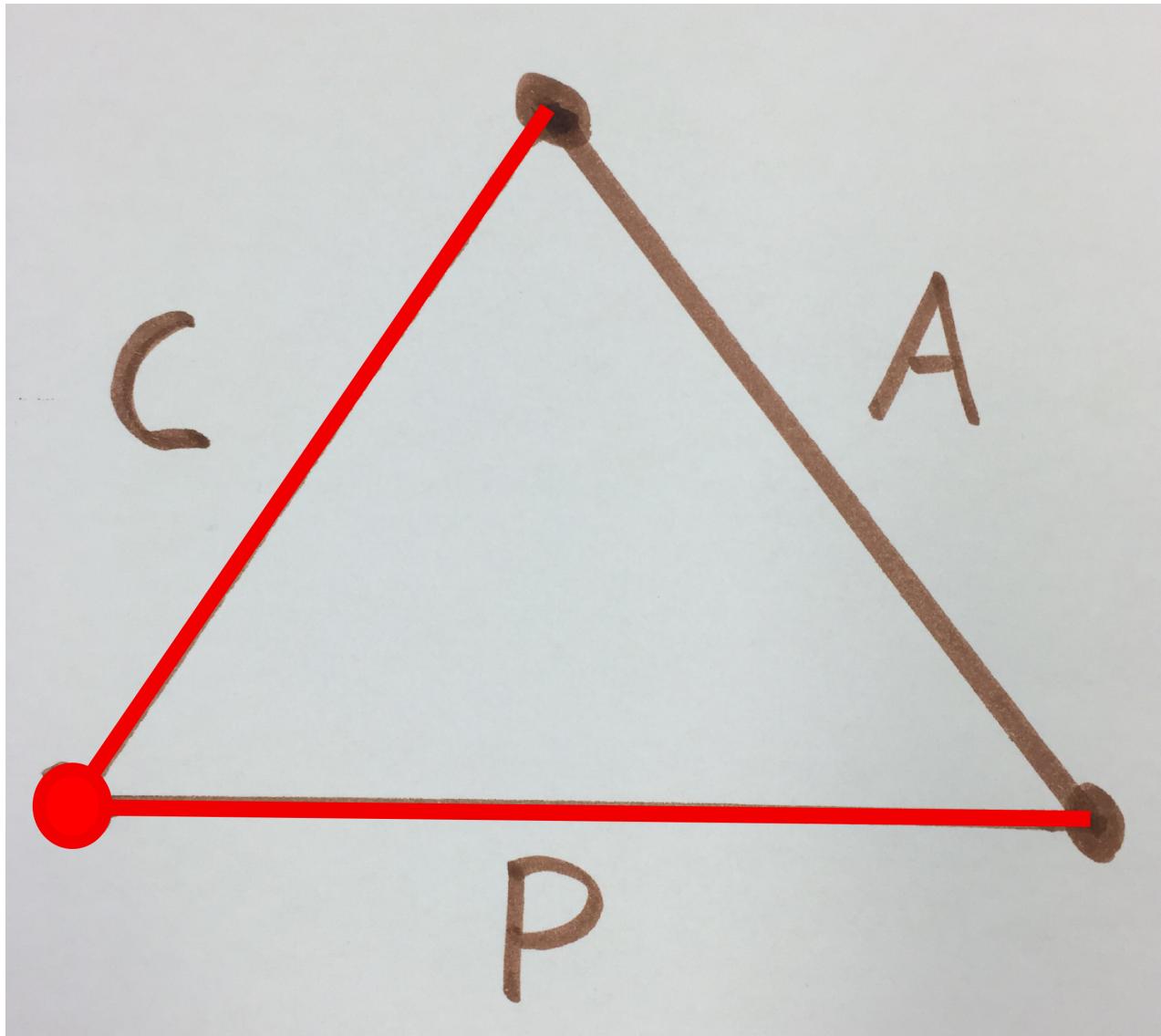
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Dimensionality

APC is based on 2 events. Its tesselated diagram is 2d. hmmm

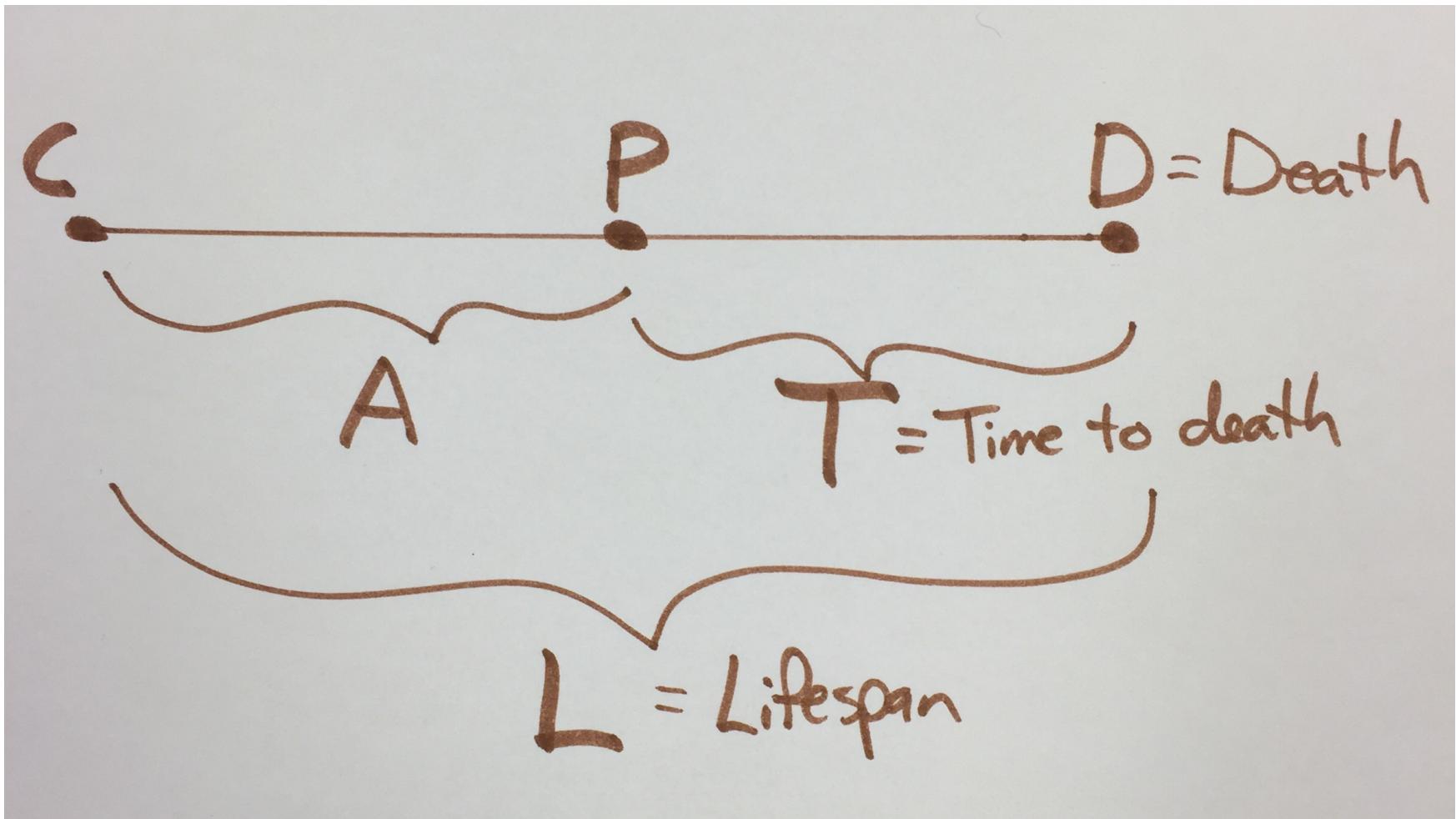


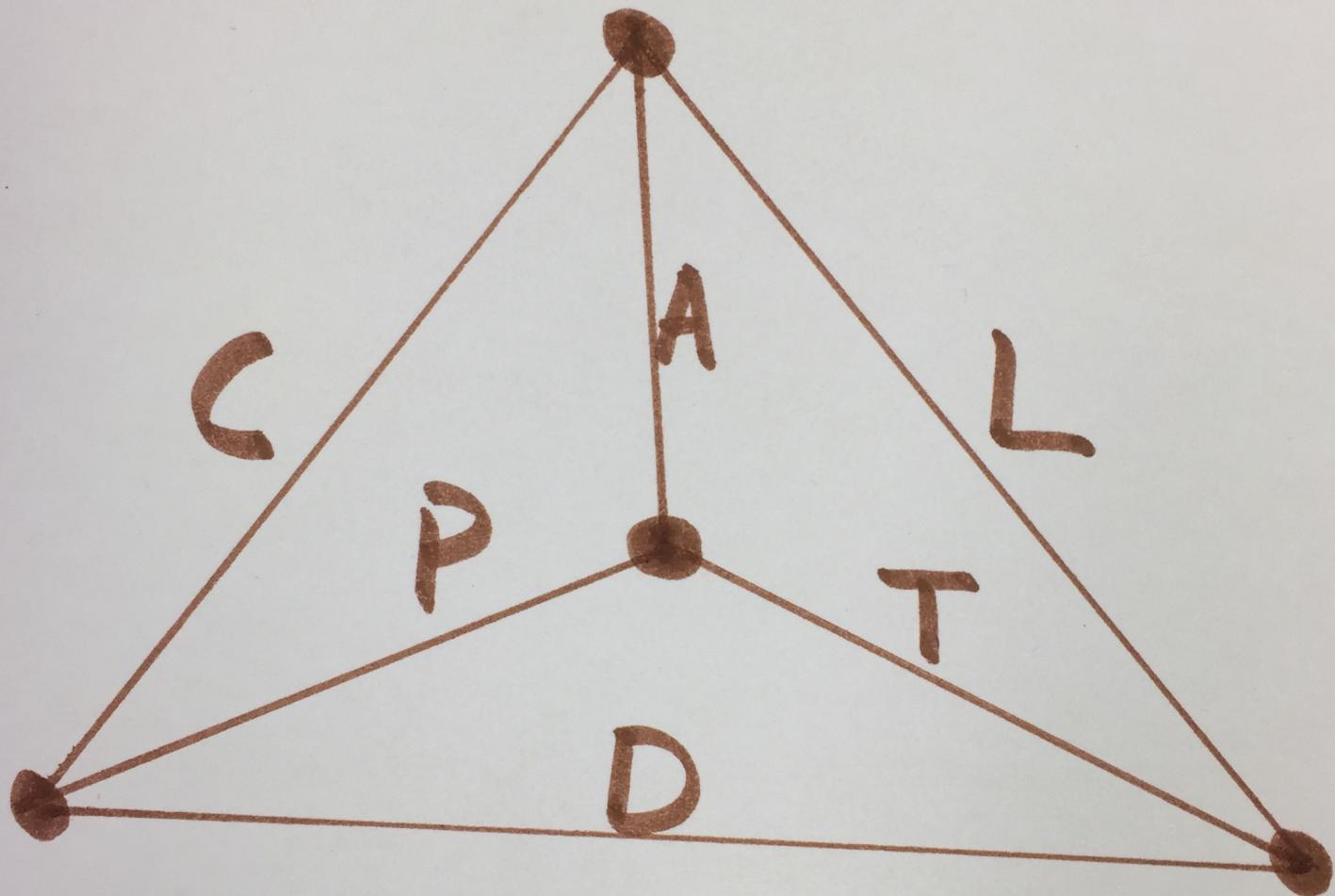
What happens if we add another event?

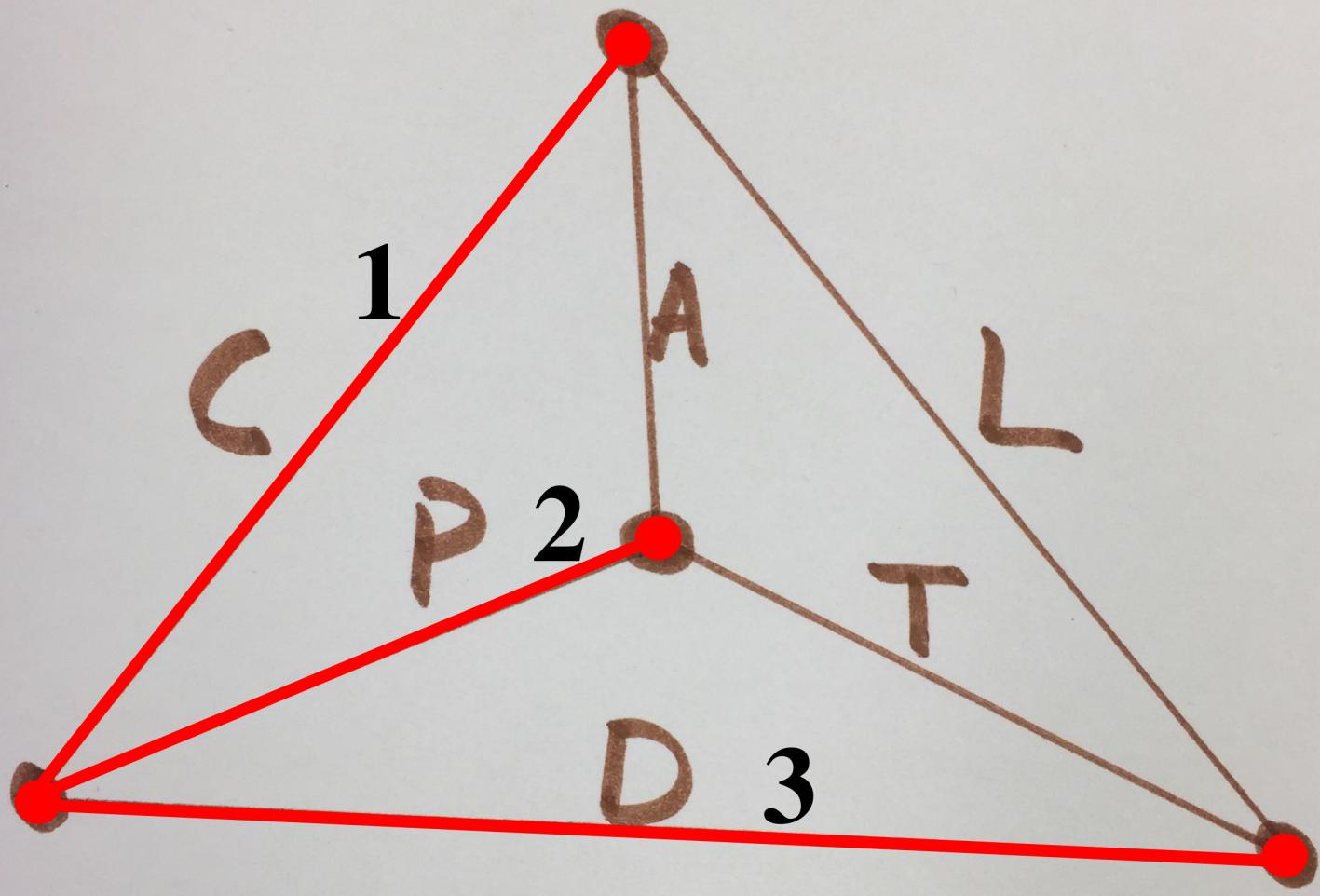
such as *death*.

APCTDL identity

- 1) $\{P - C = A\}$, 2) $\{D - P = T\}$, 3) $\{D - C = L\}$

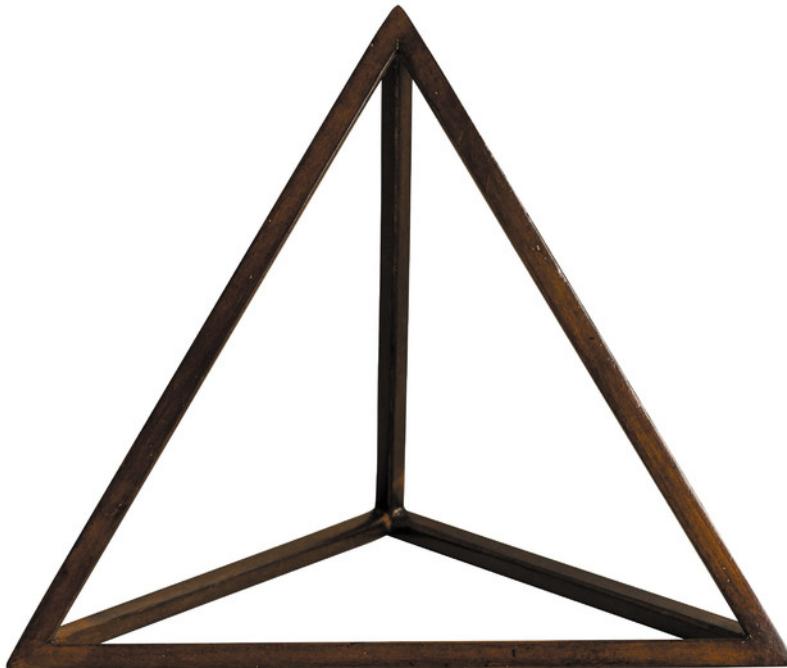






Dimensionality

APCTDL has 3 events. Its extent after tesselation is 3d. hmmm



a nice wooden tetrahedron

Further considerations

- n events implies n -dimensionality
- 3 events implies 3 durations.
- in general n events implies $\binom{n}{2}$ durations.

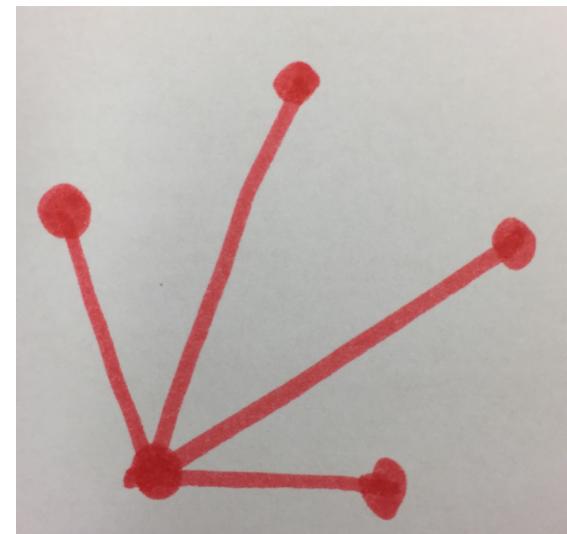
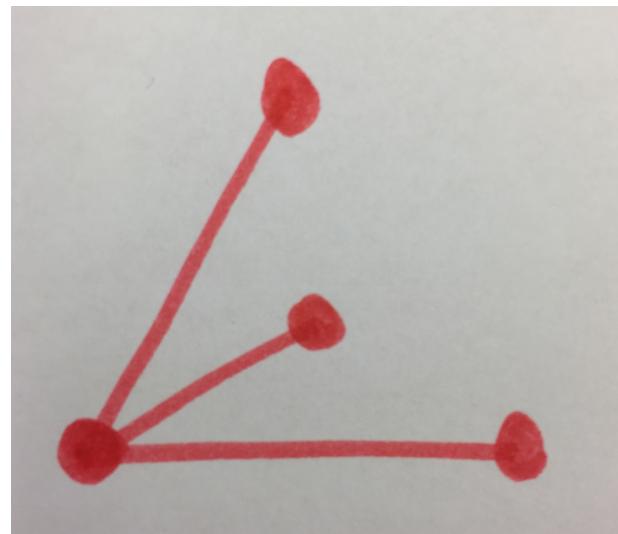
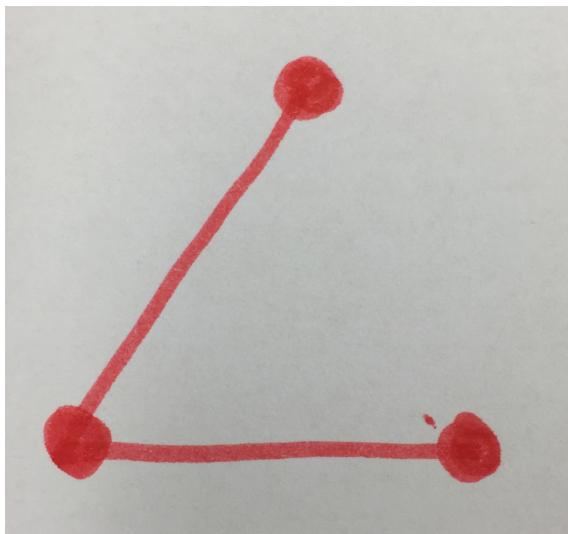
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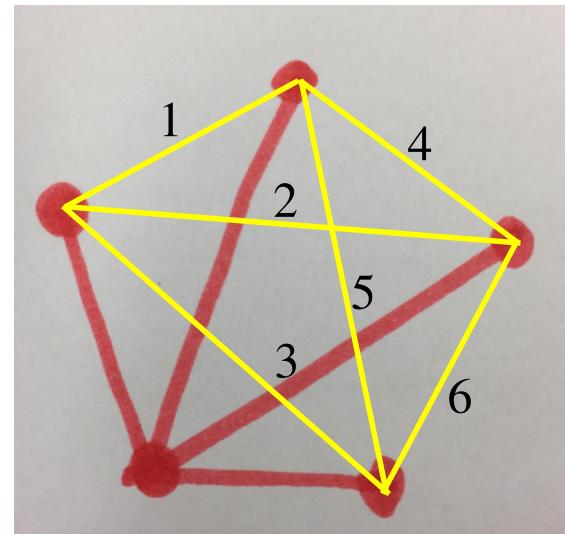
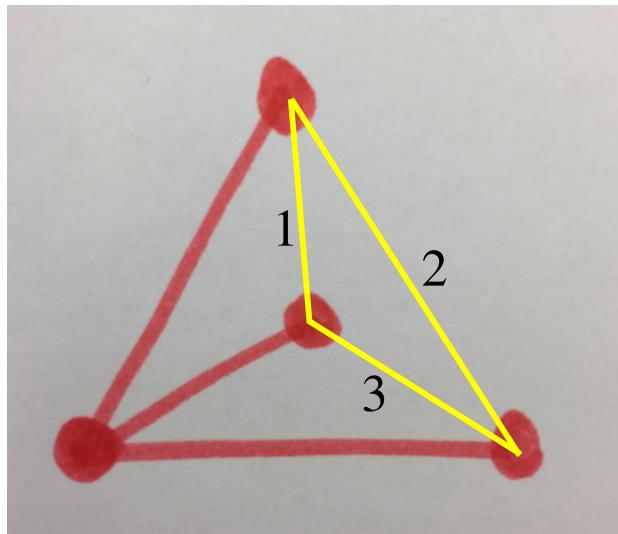
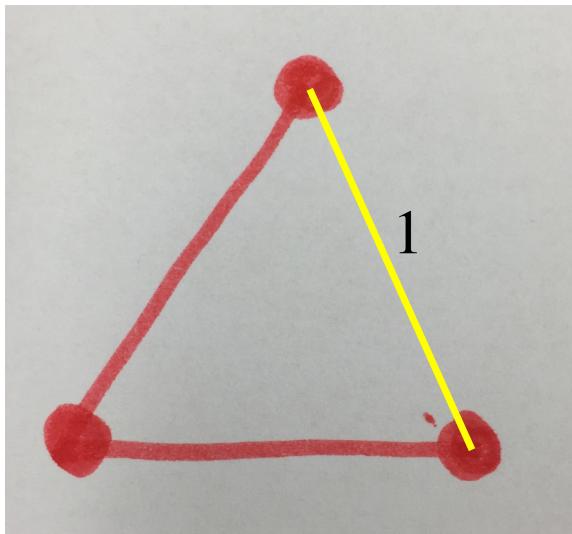
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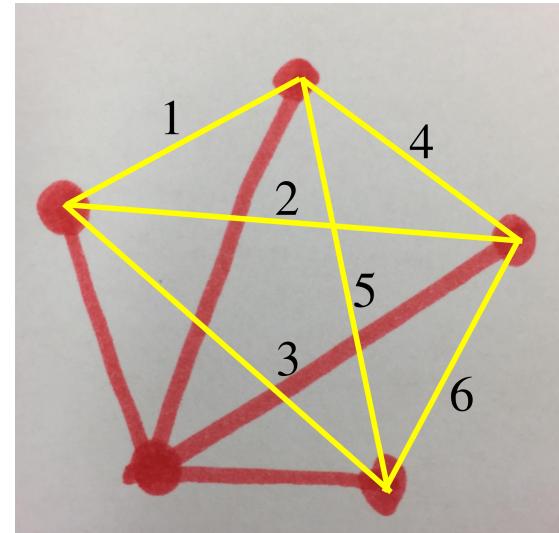
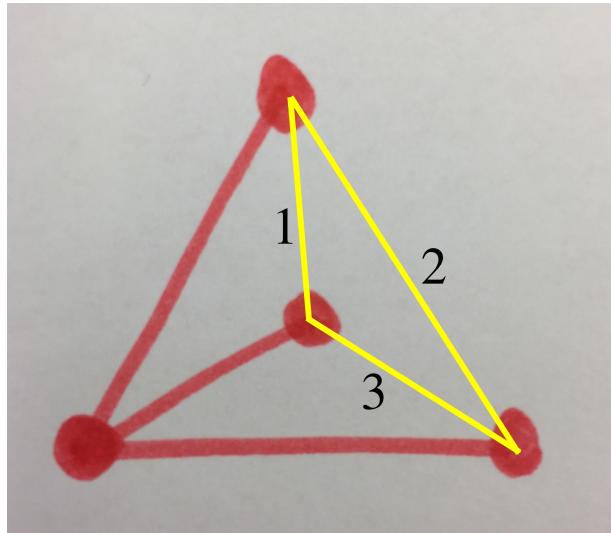
(Just complete the graph by connecting all ends)

- n events imply $\binom{n}{2}$ durations
- n events imply an identity of $n + \binom{n}{2}$ time measures
- This identity can be represented by a complete graph on $n + 1$ vertices, say G^n .
- G^n may have subidentities.

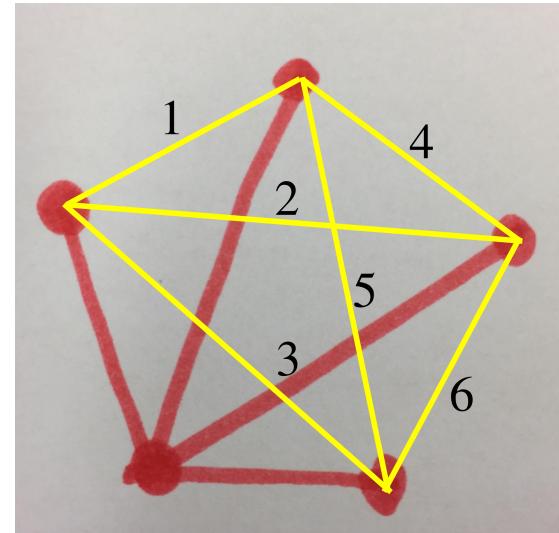
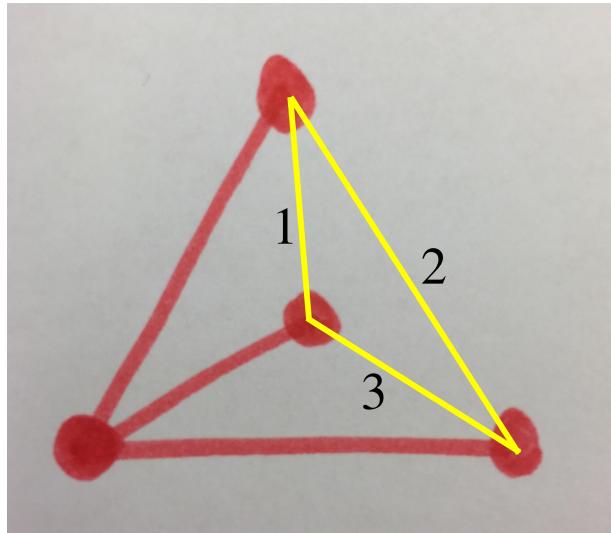
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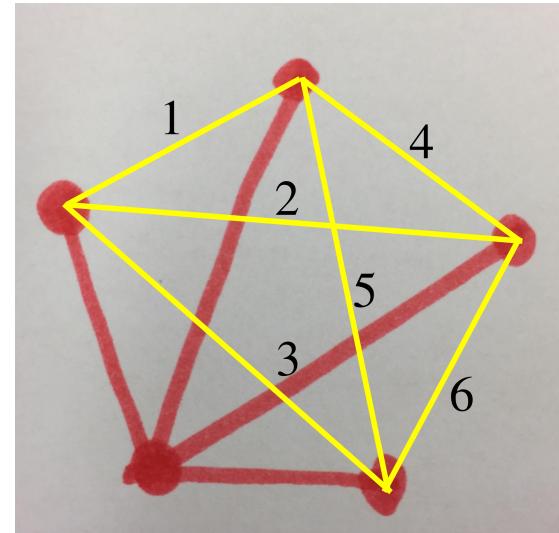
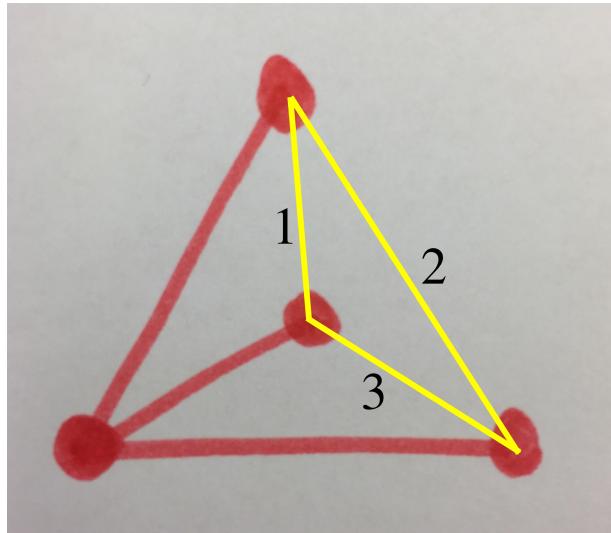
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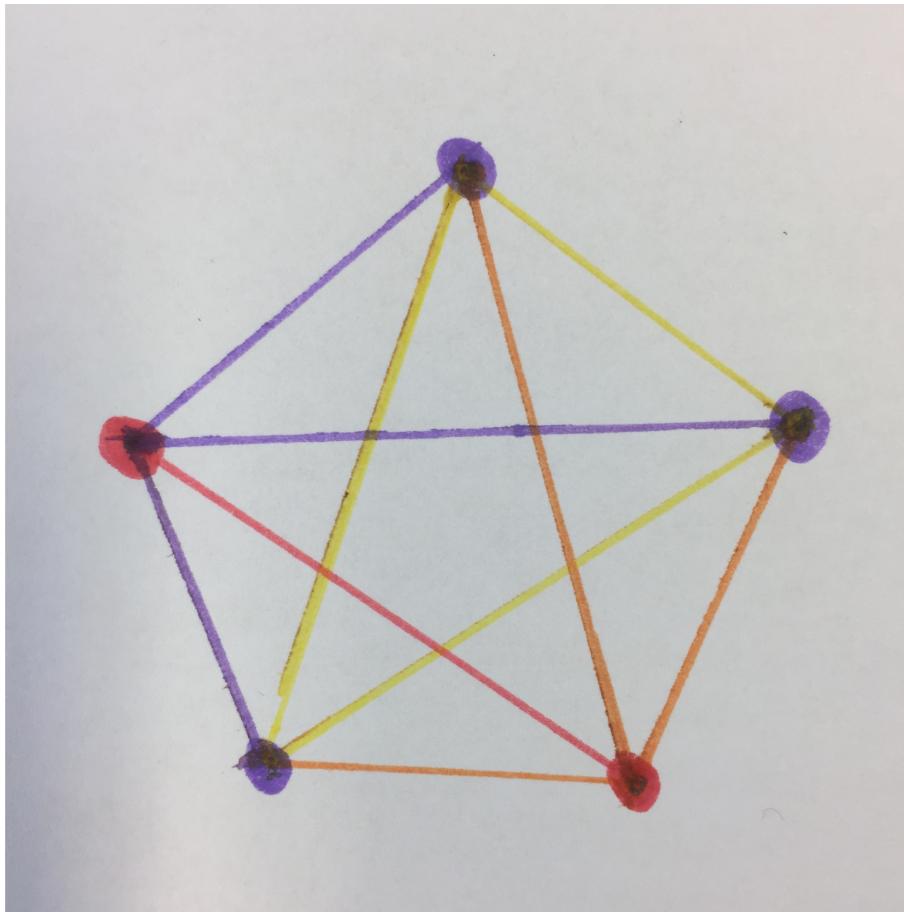
- $\binom{n}{2}$ subidentities consist in two events plus a duration
- $\binom{n}{3}$ subidentities consist in 3 durations only
- There are $\binom{n+1}{n'+1}$ subidentities of dimension n' in general



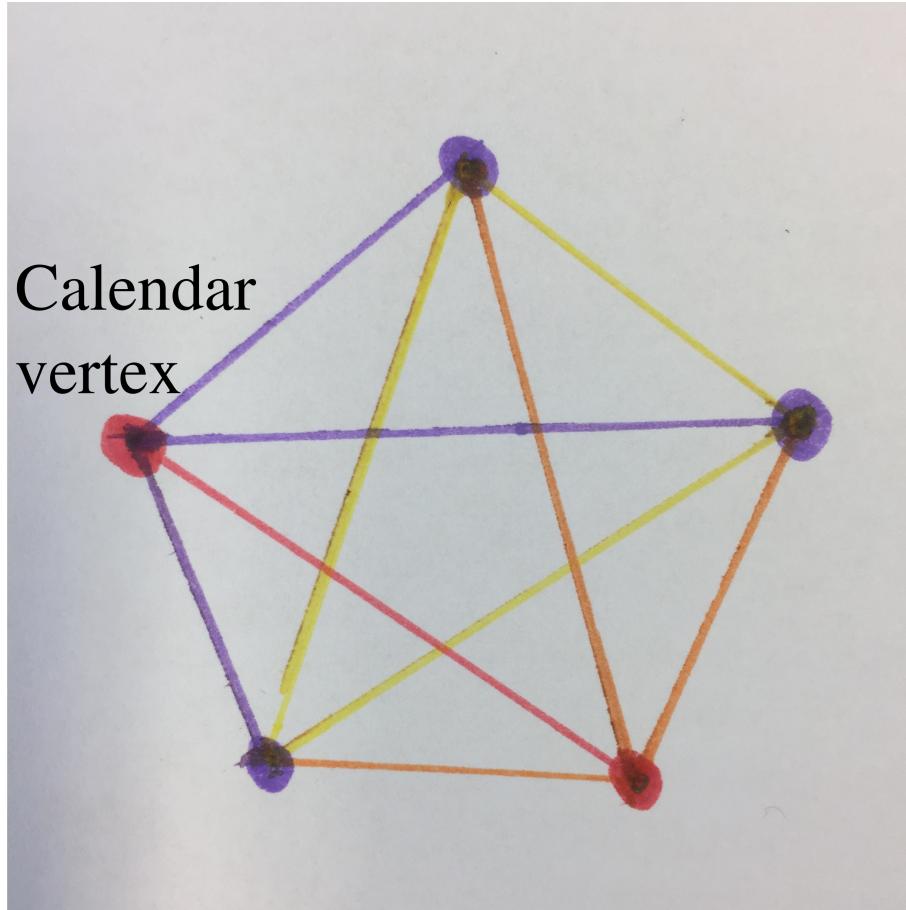
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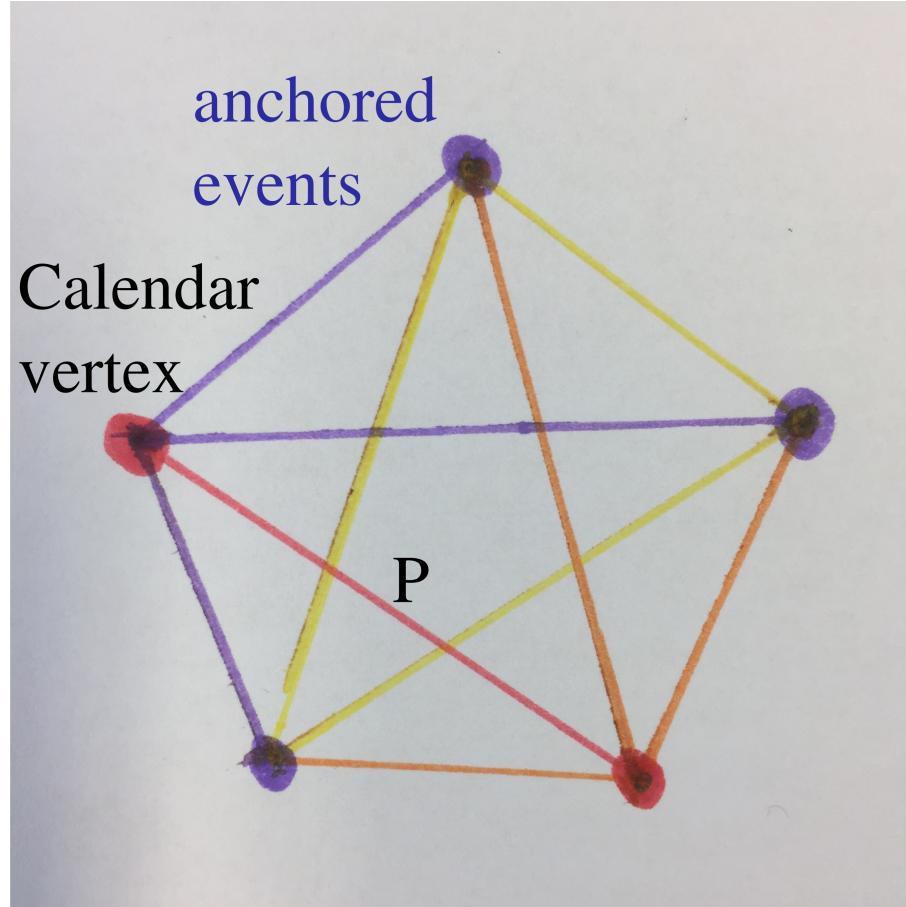
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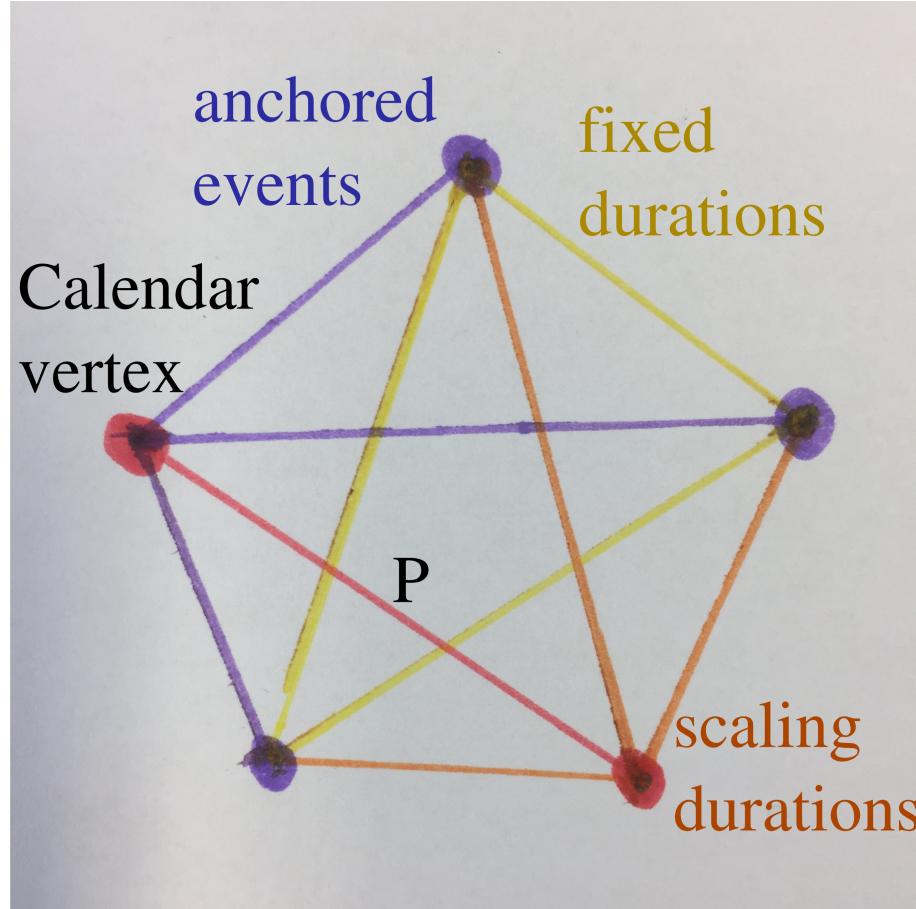
A 4-event identity



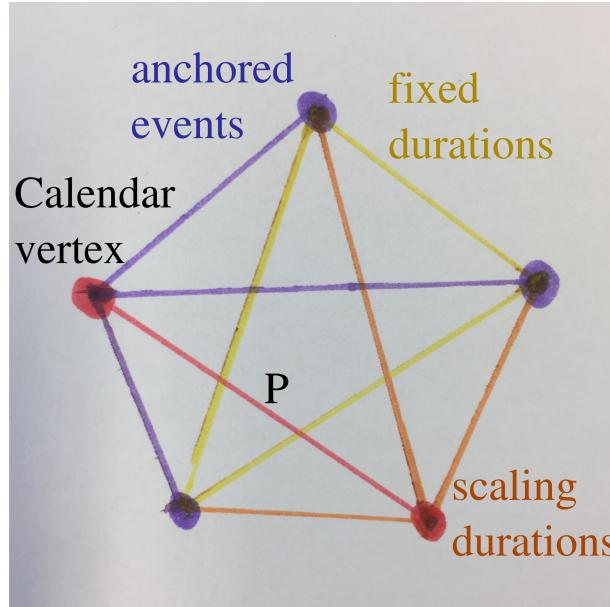
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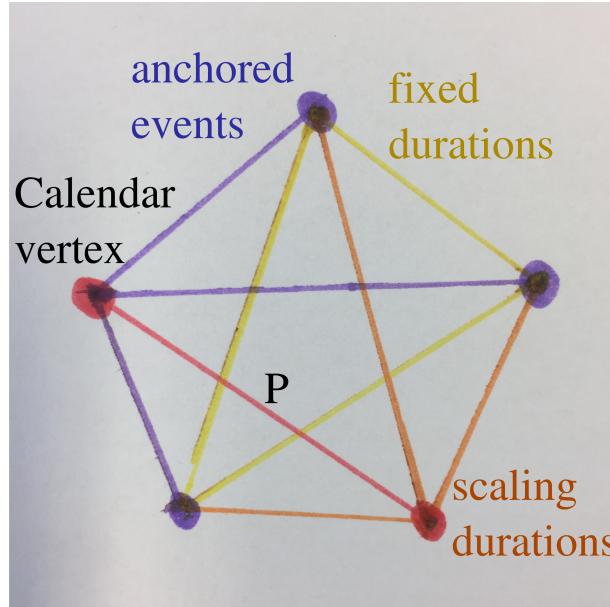
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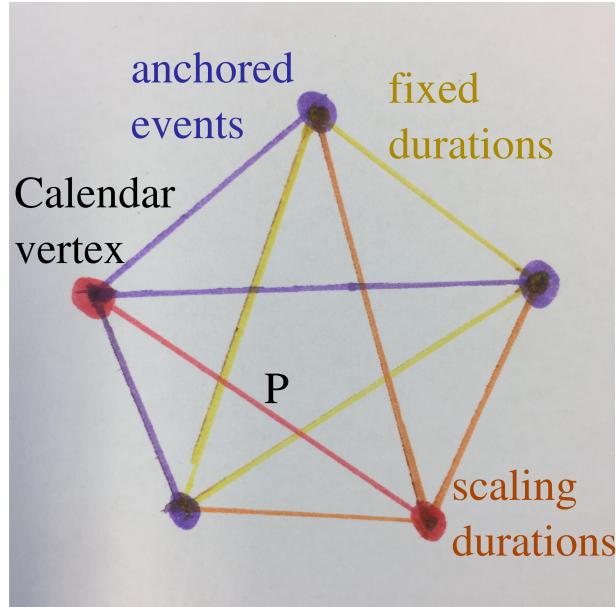
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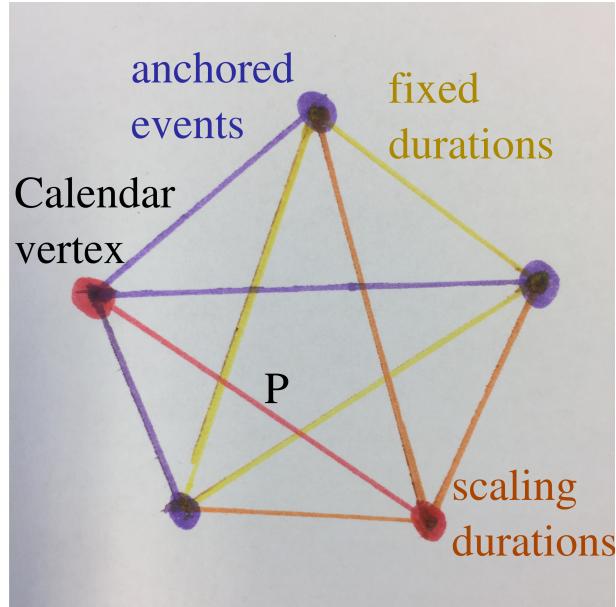
- $\binom{n}{2}$ triads of 2 events and 1 duration
- of which $\binom{n-1}{2}$ are 2 anchored events and 1 fixed duration
- and $n - 1$ are 1 anchored event, period, and 1 scaling duration.
- $\binom{n}{2} = \binom{n-1}{2} + (n - 1)$



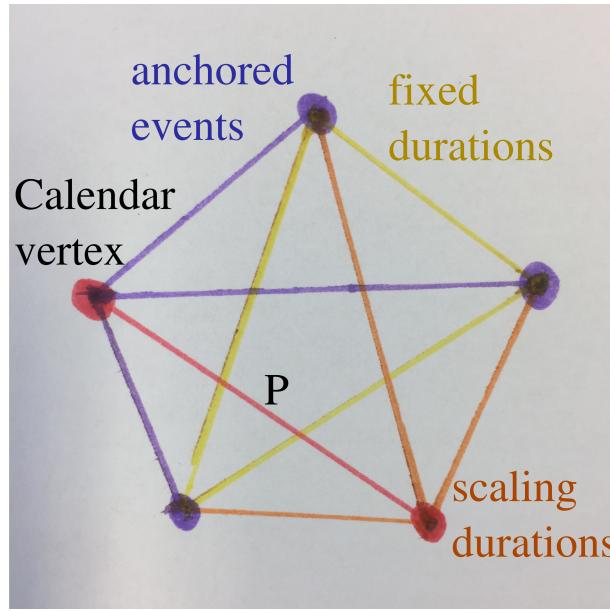
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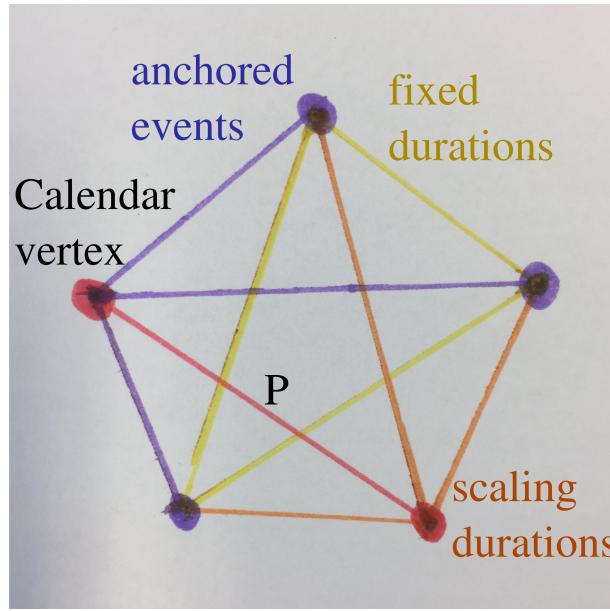
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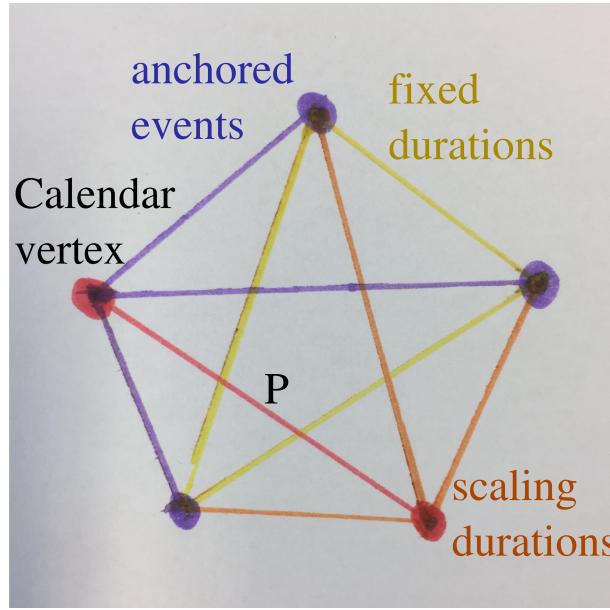
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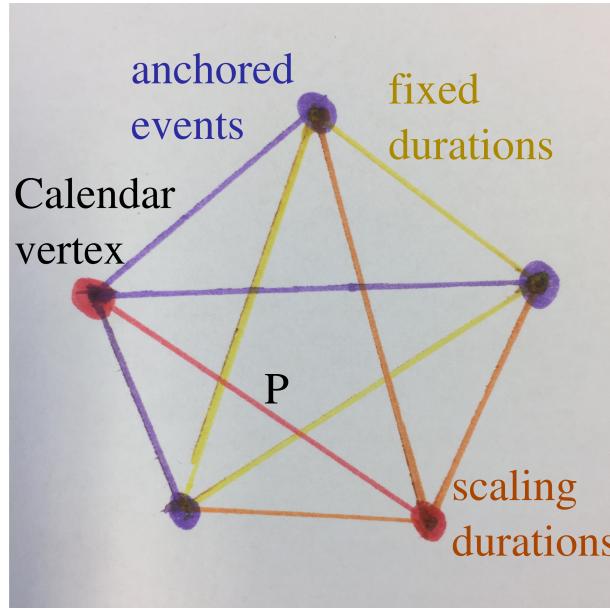
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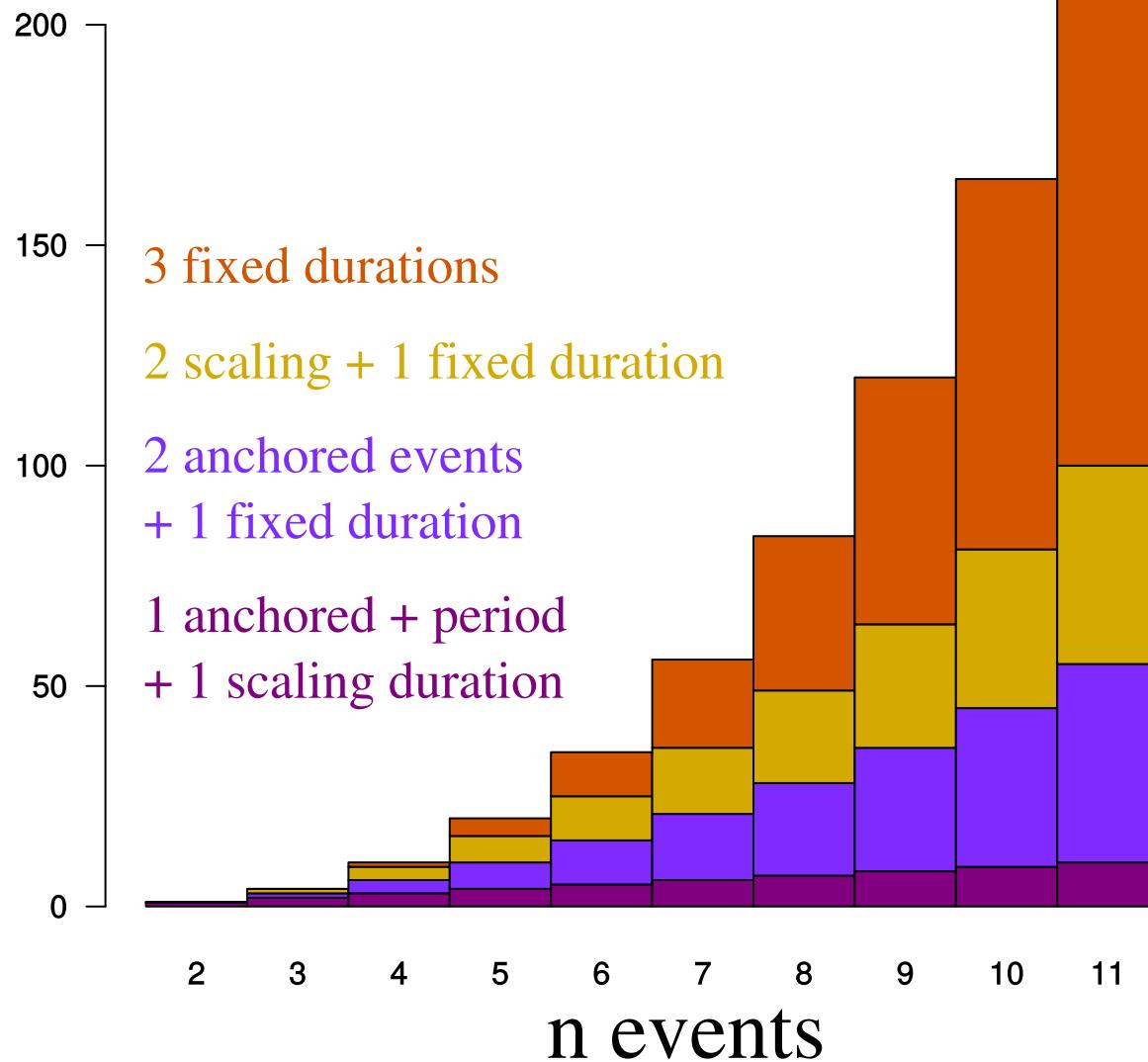


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Nr triads



Identifiability

Given an id from n events, there are $(n + 1)^{(n-1)}$ potential sets of n time measures (events and/or durations) whose linear combination yields the full implied identity. These can be represented as the minimal spanning trees (MST) of G^n .



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“Sorting Hat” Spider (*Eriovixia gryffindori*). Location: India
HT <http://earthsky.org>