

492 "Spatiotemporal formalization about the presence of parts" homework

<https://cidoc-crm.org/Issue/ID-492-spatiotemporal-formalization-about-the-presence-of-parts>

From the scope note of "P46 is composed of":

If a component is not part of a whole from the beginning of existence or until the end of existence of the whole, the classes E79 Part Addition and E80 Part Removal can be used to document when a component became part of a particular whole and/or when it stopped being a part of it. For the time-span of being part of the respective whole, the component is completely contained in the place the whole occupies.

Thus,

E18 Physical Thing P46 is composed of E18 Physical Thing
should be a weak shortcut for

E18 Physical Thing P110i was augmented by E79 Part Addition P111 added E18 Physical
Thing

E18 Physical Thing P112i was diminished by E80 Part Removal P113 removed E18 Physical
Thing

Then it inherits the already existing FOL for P46:

E18 Physical Thing x P46 is composed of E18 Physical Thing y
implies that there is a E52 Time-Span z with:

x P195i had presence E93 Presence u P164 is temporally specified by z

y P195i had presence E93 Presence w P164 is temporally specified by z

w P10 falls within u

$$P46(x,y) \Rightarrow (\exists z,u,w) [E52(z) \wedge E93(u) \wedge P195i(x,u) \wedge P164(u,z) \wedge E93(w) \wedge P195i(y,w) \wedge P164(w,z) \wedge P10(w,u)]$$

Add to this a more precise temporal relationship between z and the activity (here for E79 Part Addition):

at the beginning of the E79 Part Addition, y is not yet part of x
(how to treat the time inbetween?)

at the end of the addition, y is part of x

→ E79 Part Addition P182 ends before or with the start of z ?

MD: there is an alternative

If we for one second accept that E93 Presence is a function of a Physical Thing or STV and a Time-Span:

$$u = F93(x,z) \Rightarrow E93(u) \wedge [E18(x) \vee E92(x)] \wedge E52(z)$$

$$u = F93(x,z) \Leftrightarrow [P195(u,x) \vee P166(u,x)] \wedge P164(u,z)$$

we can write

$$P46(x,y) \Rightarrow (\exists z) [P10(F93(y,z), F93(x,z))]$$

For E79 Part Addition:

x P110i was augmented by E79 Part Addition p P111 added y

$$\Rightarrow (\exists z) [P10(F93(y,z), F93(x,z)) \wedge P182(p,z)]$$

TODO: I haven't retrofitted the function notation back to a relation notation yet.

Question: where to add this FOL axiom? A natural place seems to be E79 Part Addition, but that would be a first for a class.

MD: P46 composed of

MD: removal is not symmetric to addition, object may be created by the removal

MD: destruction: no info about the state of the parts

How to proceed: return to this once there is a votable proposal (or some substantial progress that needs to be reported)