BFO 2020 Existence Instantiation Axioms

Particulars exist at some time [nmq-1]

$\forall p\,(\text{particular}(p) \rightarrow \exists t\,\text{existsAt}(p,t))$

Every universal is instantiated at least once [mbf-1]

$\forall u\,(\text{universal}(u) \rightarrow \exists p,t\,\text{instanceOf}(p,u,t))$

Exists at is dissective on first argumentwhen it is a continuant [uns-1]

$\forall p,q,r\,(\text{existsAt}(p,q) \wedge \text{continuantPartOf}(r,p,q) \rightarrow \text{existsAt}(r,q))$

Instance of is dissective on third argument, a temporal region [qaf-1]

$\forall p,q,r,s\,(\text{instanceOf}(p,q,r) \wedge \text{temporalPartOf}(s,r) \rightarrow \text{instanceOf}(p,q,s))$

Relata of exists at are particulars. [oap-1]

$\forall i,t\,(\text{existsAt}(i,t) \rightarrow \text{particular}(i) \wedge \text{particular}(t) \wedge \text{instanceOf}(t,\text{temporalRegion},t))$

Relata of instance of are particular, universal, temporal region. [lqn-1]

$\forall i,u,t\,(\text{instanceOf}(i,u,t) \rightarrow \text{particular}(i) \wedge \text{universal}(u) \wedge \text{instanceOf}(t,\text{temporalRegion},t))$

There is always something that exists [nis-1]

$\forall t\,(\text{instanceOf}(t,\text{temporalRegion},t)$
$\quad \rightarrow \exists u,i\,(i \neq t \wedge \text{universal}(u) \wedge \text{particular}(i) \wedge \text{instanceOf}(i,u,t)))$

If m is a material entity, then there is some one dimensional temporal region during which m exists [zuw-1]

$\forall m\,(\exists t\,\text{instanceOf}(m,\text{materialEntity},t)$
$\quad \rightarrow \exists t\,(\text{instanceOf}(t,\text{oneDimensionalTemporalRegion},t) \wedge \text{existsAt}(m,t)))$

If you exist you instatiate a universal and vice versa [bee-1]

$\forall a,t\,(\exists u\,(\text{universal}(u) \wedge \text{instanceOf}(a,u,t) \wedge \text{instanceOf}(t,\text{temporalRegion},t))$
$\quad \leftrightarrow \text{particular}(a) \wedge \text{instanceOf}(t,\text{temporalRegion},t) \wedge \text{existsAt}(a,t))$

Alan Ruttenberg, January 8, 2024. The most recent version of this file will always be in the GitHub repository https://github.com/bfo-ontology/bfo-2020