BFO 2020 Generic Dependence Axioms

Concretizes and is concretized by are inverse relations [zba-1]

$$\forall t,a,b\,(\text{concretizes}(a,b,t) \leftrightarrow \text{isConcretizedBy}(b,a,t))$$

Generically depends on and is carrier of are inverse relations [mvp-1]

$$\forall t,a,b\,(\text{genericallyDependsOn}(a,b,t) \leftrightarrow \text{isCarrierOf}(b,a,t))$$

Concretizes is dissective on third argument, a temporal region [nyz-1]

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

A generically dependent continuant is at all times at which it exists concretized by something [ibk-1]

$$\forall t,g\,(\text{instanceOf}(g,\text{genericallyDependentContinuant},t) \rightarrow \exists s,tp\,(\text{temporalPartOf}(tp,t) \wedge \text{concretizes}(s,g,tp)))$$

A g dependent continuant b g depends on an independent continuant c at t means: there inheres in c at t an s dependent continuant which concretizes b at t [otx-1]

$$\forall g,c,t\,(\text{genericallyDependsOn}(g,c,t) \rightarrow \exists s,tp\,(\text{temporalPartOf}(tp,t) \wedge \text{inheresIn}(s,c) \wedge \text{concretizes}(s,g,tp)))$$

Concretizes is time indexed and has domain: specifically dependent continuant or process and range: generically dependent continuant [rog-1]

$$\forall a,b,t\,(\text{concretizes}(a,b,t) \rightarrow (\text{instanceOf}(a,\text{specificallyDependentContinuant},t) \vee \text{instanceOf}(a,\text{process},t)) \wedge \text{instanceOf}(b,\text{genericallyDependentContinuant},t) \wedge \text{instanceOf}(t,\text{temporalRegion},t))$$

Generically depends on is time indexed and has domain: generically dependent continuant and range: independent continuant but not spatial region [ekp-1]

$$\forall a,b,t\,(\text{genericallyDependsOn}(a,b,t) \rightarrow \text{instanceOf}(a,\text{genericallyDependentContinuant},t) \wedge \text{instanceOf}(b,\text{independentContinuant},t) \wedge \neg\text{instanceOf}(b,\text{spatialRegion},t) \wedge \text{instanceOf}(t,\text{temporalRegion},t))$$

If a specifically dependent continuant concretizes a gdc then the gdc generically depends on the bearer of the sdc [cik-1]

$$\forall g,b,sdc\,(\exists t\,\text{instanceOf}(g,\text{genericallyDependentContinuant},t) \wedge \exists t\,\text{instanceOf}(sdc,\text{specificallyDependentContinuant},t) \wedge \exists t\,\text{instanceOf}(b,\text{independentContinuant},t) \rightarrow \forall t\,(\text{concretizes}(sdc,g,t) \wedge \text{inheresIn}(sdc,b) \rightarrow \text{genericallyDependsOn}(g,b,t)))$$

If a generically dependent continuant participates in a process p then, if it is concretized as a process, that process is part of p, fand if concretized as an sdc then the bearer of that sdc participates in the process [fmm-1]

$$\forall gdc,p,t\,(\text{instanceOf}(gdc,\text{genericallyDependentContinuant},t) \wedge \text{participatesIn}(gdc,p,t) \rightarrow \exists tp,b\,(\text{temporalPartOf}(tp,t) \wedge \text{concretizes}(b,gdc,tp) \wedge ((\text{instanceOf}(b,\text{specificallyDependentContinuant},tp) \wedge (\exists ic\,(\text{specificallyDependsOn}(b,ic) \wedge \text{participatesIn}(ic,p,tp)))) \vee (\text{occurrentPartOf}(b,p) \wedge \text{existsAt}(b,tp)))))$$

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