BFO 2020 Generic Dependence Axioms

(1) A generically dependent continuant is at all times at which it exists concretized by something

$\forall t,g \, (instanceOf(g,genericallyDependentContinuant,t)$
$\rightarrow \exists s,tp \, (temporalPartOf(tp,t) \land concretizes(s,g,tp)))$

(2) Concretizes is dissective on third argument, a temporal region

$\forall p,q,r,s \, (concretizes(p,q,r) \land temporalPartOf(s,r) \rightarrow concretizes(p,q,s))$

(3) Concretizes is time indexed and has domain: specifically dependent continuant or process and range: generically dependent continuant

$\forall a,b,t \, (concretizes(a,b,t)$
$\rightarrow (instanceOf(a,specificallyDependentContinuant,t) \lor instanceOf(a,process,t))$
$\land instanceOf(b,genericallyDependentContinuant,t)$
$\land instanceOf(t,temporalRegion,t))$

(4) 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

$\forall g,c,t \, (genericallyDependsOn(g,c,t)$
$\rightarrow \exists s,tp \, (temporalPartOf(tp,t) \land inheresIn(s,c) \land concretizes(s,g,tp)))$

(5) 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

$\forall gdc,p,t \, (instanceOf(gdc,genericallyDependentContinuant,t) \land participatesIn(gdc,p,t)$
$\rightarrow \exists tp,b \, (temporalPartOf(tp,t) \land concretizes(b,gdc,tp)$
$\land ((instanceOf(b,specificallyDependentContinuant,tp)$
$\land (\exists ic \, (specificallyDependsOn(b,ic) \land participatesIn(ic,p,tp))))$
$\lor (occurrentPartOf(b,p) \land existsAt(b,tp)))))$

(6) Generically depends on and is carrier of are inverse relations

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

(7) Concretizes and is concretized by are inverse relations

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

(8) Generically depends on is time indexed and has domain: generically dependent continuant and range: independent continuant but not spatial region

$\forall a,b,t \, (genericallyDependsOn(a,b,t)$
$\rightarrow instanceOf(a,genericallyDependentContinuant,t)$
$\land instanceOf(b,independentContinuant,t) \land \neg instanceOf(b,spatialRegion,t)$
$\land instanceOf(t,temporalRegion,t))$

(9) If a specifically dependent continuant concretizes a gdc then the gdc generically depends on the bearer of the sdc

$\forall g,b,sdc \, (\exists t \, instanceOf(g,genericallyDependentContinuant,t)$
$\land \exists t \, instanceOf(sdc,specificallyDependentContinuant,t)$
$\land \exists t \, instanceOf(b,independentContinuant,t)$
$\rightarrow \forall t \, (concretizes(sdc,g,t) \land inheresIn(sdc,b) \rightarrow genericallyDependsOn(g,b,t)))$