(1) If \( s \) \( s \) depends on \( c \) at \( t \) then \( s \) and \( c \) do not share common parts (\( s,c \) continuants)

\[
\forall s,c (\text{specificallyDependsOn}(s,c) \\
\rightarrow \neg (\exists w,t (\text{continuantPartOf}(w,s,t) \land \text{continuantPartOf}(w,c,t)))
\]

(2) Specifically depends on and specifically depended on by are inverse relations

\[
\forall a,b (\text{specificallyDependsOn}(a,b) \leftrightarrow \text{specificallyDependedOnBy}(b,a))
\]

(3) Inheres in has domain specifically dependent continuant and range independent continuant but not spatial region

\[
\forall a,b (\text{inheresIn}(a,b) \\
\rightarrow \exists t \text{instanceOf}(a,\text{specificallyDependentContinuant},t) \\
\land (\exists t \text{instanceOf}(b,\text{independentContinuant},t) \land \neg \text{instanceOf}(b,\text{spatialRegion},t)))
\]

(4) Has material basis and material basis of are inverse relations

\[
\forall t,a,b (\text{hasMaterialBasis}(a,b,t) \leftrightarrow \text{materialBasisOf}(b,a,t))
\]

(5) DEFINITION: \( b \) is a relational quality = Def. \( b \) is a quality and there exists distinct \( c \) and \( d \) such that at all times \( t \), \( b \) inheres in \( c \) at \( t \) if and only \( b \) specifically depends on \( d \) at \( t \).

\[
\forall b \exists t \text{instanceOf}(b,\text{relationalQuality},t) \\
\leftrightarrow (\exists c,d (c \neq d \land \text{inheresIn}(b,c) \land \text{specificallyDependsOn}(b,d)) \\
\land \exists t \text{instanceOf}(b,\text{quality},t))
\]

(6) Inheres in and bearer of are inverse relations

\[
\forall a,b (\text{inheresIn}(a,b) \leftrightarrow \text{bearerOf}(b,a))
\]

(7) Specifically depends on has domain specifically dependent continuant and range specifically dependent continuant or independent continuant but not spatial region

\[
\forall a,b (\text{specificallyDependsOn}(a,b) \\
\rightarrow \exists t \text{instanceOf}(a,\text{specificallyDependentContinuant},t) \\
\land (\exists t \text{instanceOf}(b,\text{specificallyDependentContinuant},t) \\
\lor (\text{instanceOf}(b,\text{independentContinuant},t) \land \neg \text{instanceOf}(b,\text{spatialRegion},t)))
\]

(8) A role exists at least at the beginning of the realization process

\[
\forall r,p (\text{realizes}(p,r) \\
\rightarrow \exists \text{proct,first}(\text{occupiesTemporalRegion}(p,\text{proct}) \land \text{hasFirstInstant}(\text{proct,first}) \\
\land \text{existsAt}(r,\text{first}))
\]

(9) Has material basis is time indexed and has domain: disposition and range: material entity

\[
\forall a,b,t (\text{hasMaterialBasis}(a,b,t) \\
\rightarrow \text{instanceOf}(a,\text{disposition},t) \land \text{instanceOf}(b,\text{materialEntity},t) \\
\land \text{instanceOf}(t,\text{temporalRegion},t))
\]

(10) Realizes has domain process and range realizable entity

\[
\forall a,b (\text{realizes}(a,b) \rightarrow \exists t \text{instanceOf}(a,\text{process},t) \land \exists t \text{instanceOf}(b,\text{realizableEntity},t))
\]

(11) A \( \text{inheresIn} \) \( b \) at \( t \) =Def. \( a \) is a specifically dependent continuant and \( b \) is an independent continuant that is not a spatial region and \( a \) \( s \) depends on \( b \) at \( t \).

\[
\forall a,b (\text{inheresIn}(a,b) \\
\leftrightarrow \text{specificallyDependsOn}(a,b) \\
\land (\exists t \text{instanceOf}(a,\text{specificallyDependentContinuant},t) \\
\land \text{instanceOf}(b,\text{independentContinuant},t) \land \neg \text{instanceOf}(b,\text{spatialRegion},t)))
\]

(12) When a role is realized the bearer of the role participates in the realization process

\[
\forall r,p,b (\text{realizes}(p,r) \land \text{inheresIn}(r,b) \rightarrow \exists t \text{participatesIn}(b,p,t))
\]

(13) The material basis of a disposition is part of the bearer of the disposition
∀ m,d,b (∃ t instanceOf(m,m,materialEntity,t)∧∃ t instanceOf(d,d,disposition,t)∧∃ t instanceOf(b,b,materialEntity,t)∧inheresIn(d,b)
→ ∀ t (hasMaterialBasis(d,m,t)→continuantPartOf(m,b,t)))

(14) Specifically depends on is transitive
∀ a,b,c (specificallyDependsOn(a,b)∧specificallyDependsOn(b,c)∧a≠c
→ specificallyDependsOn(a,c))

(15) Has material basis is dissective on third argument, a temporal region
∀ p,q,r,s(hasMaterialBasis(p,q,r)∧temporalPartOf(s,r)→hasMaterialBasis(p,q,s))

(16) Definition of specifically dependent continuant.
∀ s (∃ t instanceOf(s,specificallyDependentContinuant,t)
↔ ∃ c,t(instanceOf(s,continuant,t)∧instanceOf(c,spatialRegion,t)∧specificallyDependsOn(s,c)))

(17) If x s depends on y then there’s at least one time when they both exist
∀ s,c (specificallyDependsOn(s,c)
→ (∃ t(existsAt(s,t)∧existsAt(c,t)))∧(∀ t(existsAt(s,t)→existsAt(c,t)))))

(18) Realizes and has realization are inverse relations
∀ a,b (realizes(a,b) ↔ hasRealization(b,a))

(19) At every time a specific dependent s participates in a process p there’s a part of that time, during which there’s an independent continuant that s s depends on, and that participates in p at that time
∀ sdc,p,t (instanceOf(sdc,specificallyDependentContinuant,t)∧participatesIn(sdc,p,t)
→ ∃ tp,ic (instanceOf(tp,temporalRegion,tp)
∧ instanceOf(ic,spatialRegion,tp)∧specificallyDependsOn(sdc,ic)
∧ participatesIn(ic,p,tp)))