

# The Ontological Character of Classes in the Dewey Decimal Classification

**Rebecca Green**

**Michael Panzer**

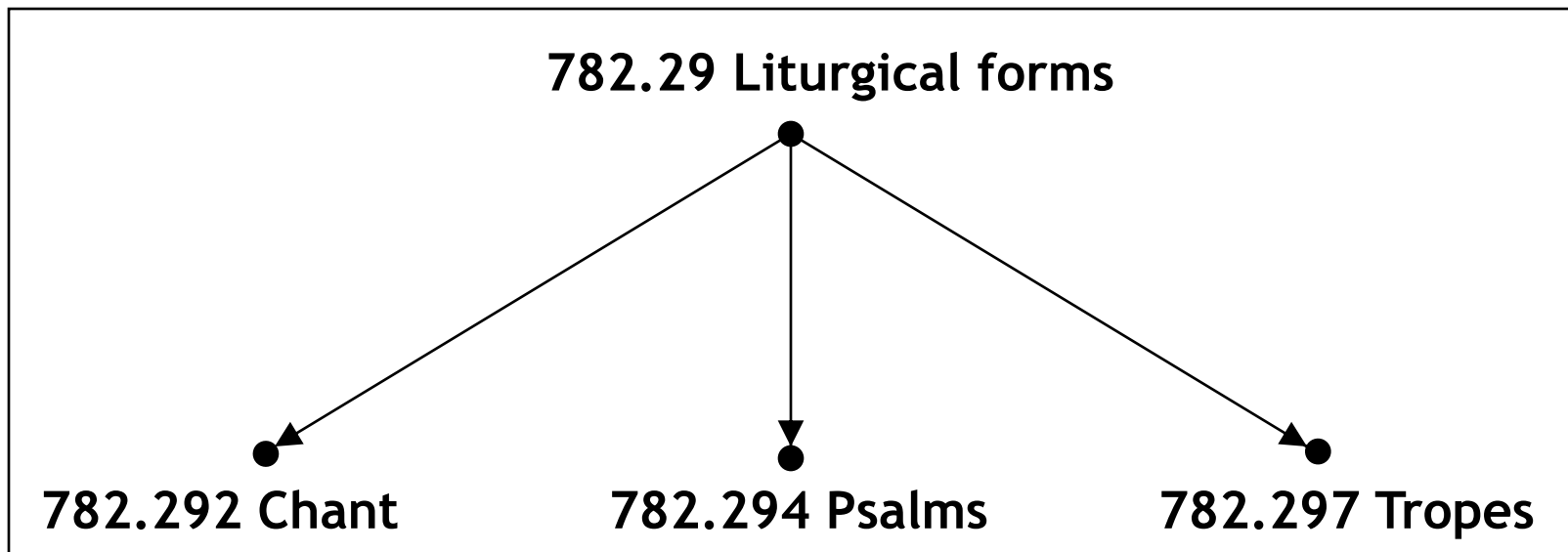
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- **Graphical representations of classes**
- **DDC classes as neighborhoods**
- **Representation of neighborhoods**

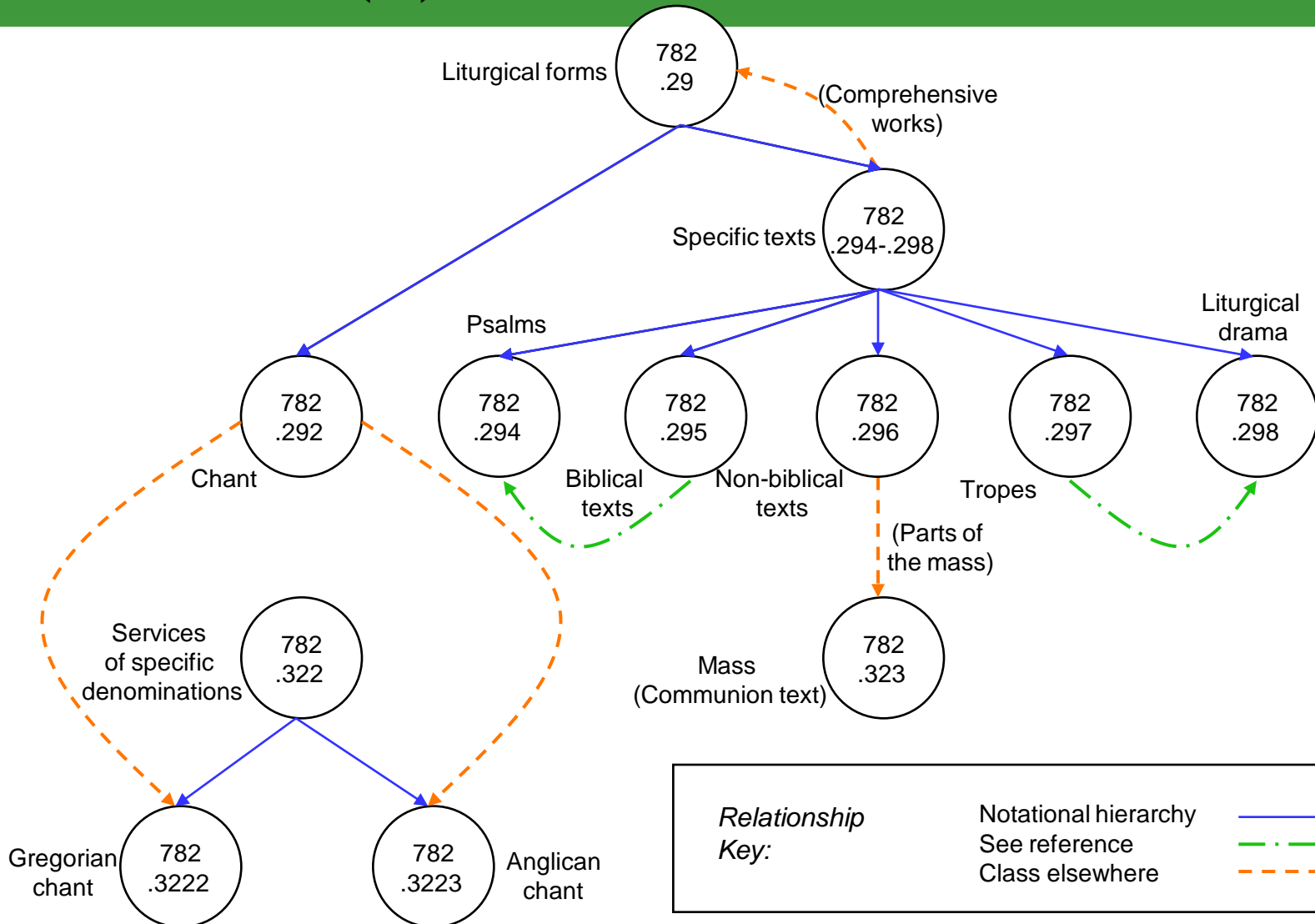
# Graphical representations of classes (1)

## Directed graph

- Classes as nodes/points ●
- Relationships as arcs/edges →

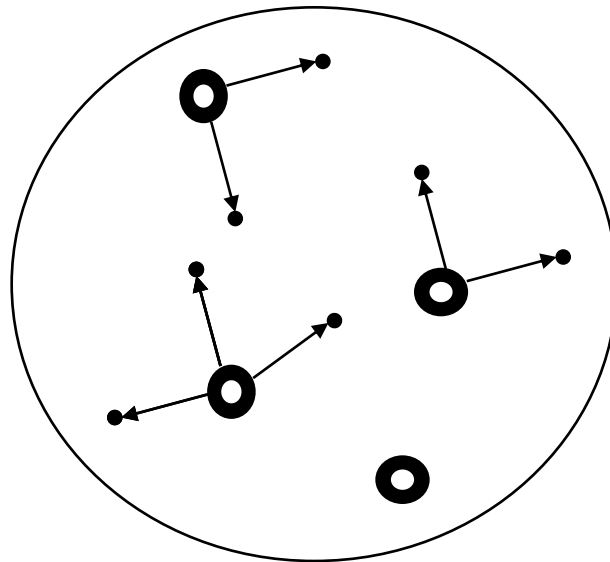


# Graphical representations of classes (2)



# Graphical representations of classes (3)

- **Classes have internal structure:**
  - Set of (focal) topics 
  - Neighborhoods develop around focal topics



# DDC classes as neighborhoods (1)



780 Music

782 Vocal music

782.2 Nondramatic vocal forms

782.23-.29 Specific sacred vocal forms

782.29 Liturgical forms

**782.292 \*Chant**

Including responses, e.g., litanies,  
suffrages

Class here plainsong

Class Gregorian chant in 782.3222;  
class Anglican chant in 782.3223

**\*Add as instructed under 782.1-782.4**

# DDC classes as neighborhoods (2)



Associating (focal) topics with classes—primary additive features

782.292      \*Chant

Including **responses**, e.g., **litanies**,  
**suffrages**

Class here **plainsong**

Class Gregorian chant in 782.3222;  
class Anglican chant in 782.3223

# DDC classes as neighborhoods (3)



## Associating (focal) topics with classes—primary subtractive features

782.292      \*Chant  
                 Including responses, e.g., litanies,  
                 suffrages  
                 Class here plainsong  
                 Class **Gregorian chant** in **782.3222**; class  
                 **Anglican chant** in **782.3223**

782.295      Biblical texts  
                 . . .  
                 *For **psalms**, see **782.294***



## Neighborhood development—subsumption

- **Specialization**
  - 782.292 Chant subsumes all types of chant, e.g., plainsong
- **Instantiation**
  - 782.292 Chant subsumes all instances of chant, e.g., Salve Regina

# DDC classes as neighborhoods (5)



## Neighborhood development—hierarchical force

**782**            **Vocal music**

>                    **782.1-782.4** **Vocal forms**  
                          **Class here treatises about and**  
                          **recordings of vocal forms for specific**  
                          **voices and ensembles**

**782.2**            **Nondramatic vocal forms**

**782.29**            **Liturgical forms**

# DDC classes as neighborhoods (6)



## Neighborhood development—standing room topics

- Responses (litanies, suffrages) in standing room
  - Notation of litanies 782.292
  - Performance of responses 782.292
  - Harmonization of responses 782.292
- In contrast, plainsong approximates the whole
  - Notation of plainsong 782.2920148
  - Performance of plainsong 782.292078
  - Harmonization of plainsong 782.2921434

# DDC classes as neighborhoods (7)



## Neighborhood development—index terms

- **Relative Index terms**
  - 782.295 Biblical texts
    - Lord's Prayer—music
- **Mapped headings**
  - 783.3222 Gregorian chant
    - Ambrosian chants
    - Prosulas

## Neighborhood development—diachronic development of classification

- Full Edition 14: 782.2 [Grand opera] Epic Wagnerian
- Full Editions 15-19: 782.2 and subdivisions not used
- Full Edition 20: Completely revised music schedule (chant previously in 783.5)

# DDC classes as neighborhoods (9)



## Neighborhood development—full vs. abridged editions

- **Abridged Edition 14**

782.2 Nondramatic vocal music

Including chants, plainsong, sacred vocal music;  
comprehensive works on cantatas

- **Full Edition 22**

782.292

\*Chant

Including responses, e.g., litanies, suffrages

Class here plainsong

Class Gregorian chant in 782.3222; class

Anglican chant in 782.3223

## Neighborhood development—rules for use

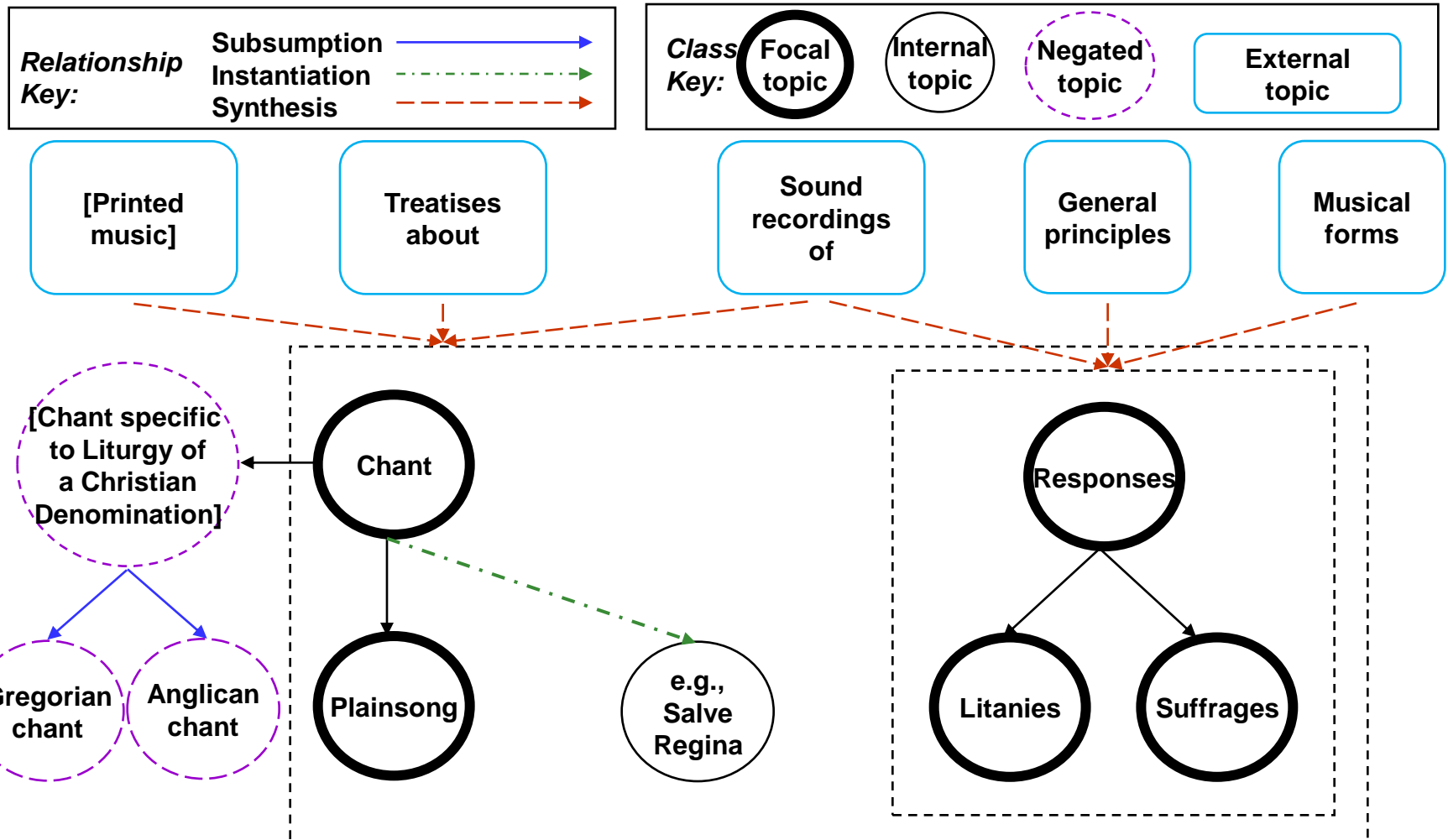
- Principles of classification in DDC
  - Rule of application, e.g., use of chant in music therapy 615.85154
  - First-of-two rule, e.g., chant and tropes 782.292
  - Rule of three, e.g., chant, psalms, and tropes 782.29

## Neighborhood development—classification of bibliographic resources

- *Plainsong in the age of polyphony* (Kelly 1992)
- *Accompaniments to plainsong for schools* (Allen 1930)



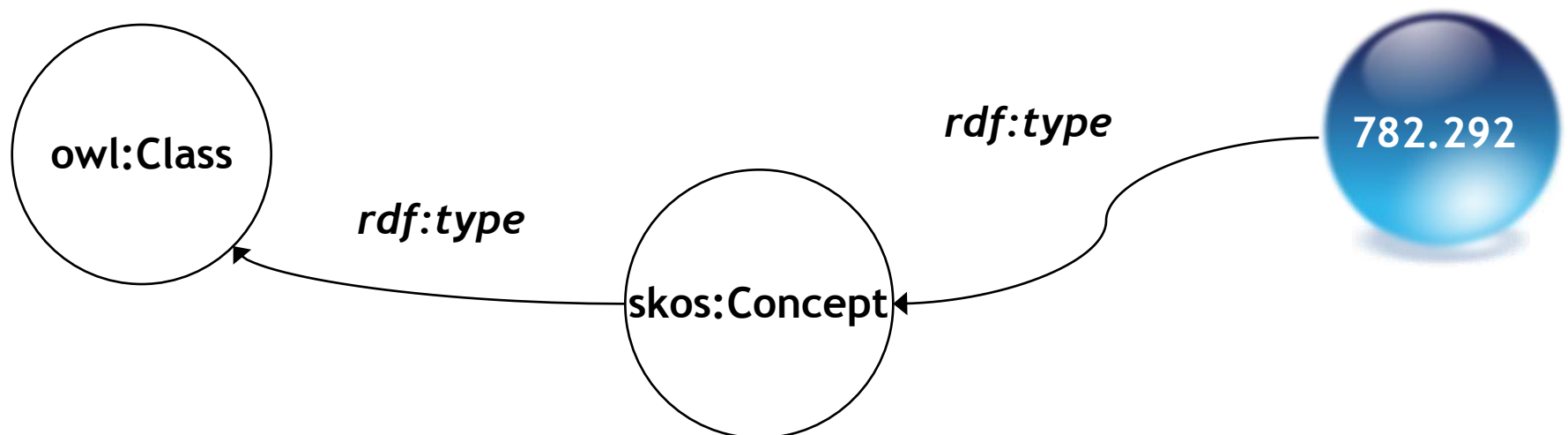
# DDC classes as neighborhoods (12)



# Representation of neighborhoods (1)



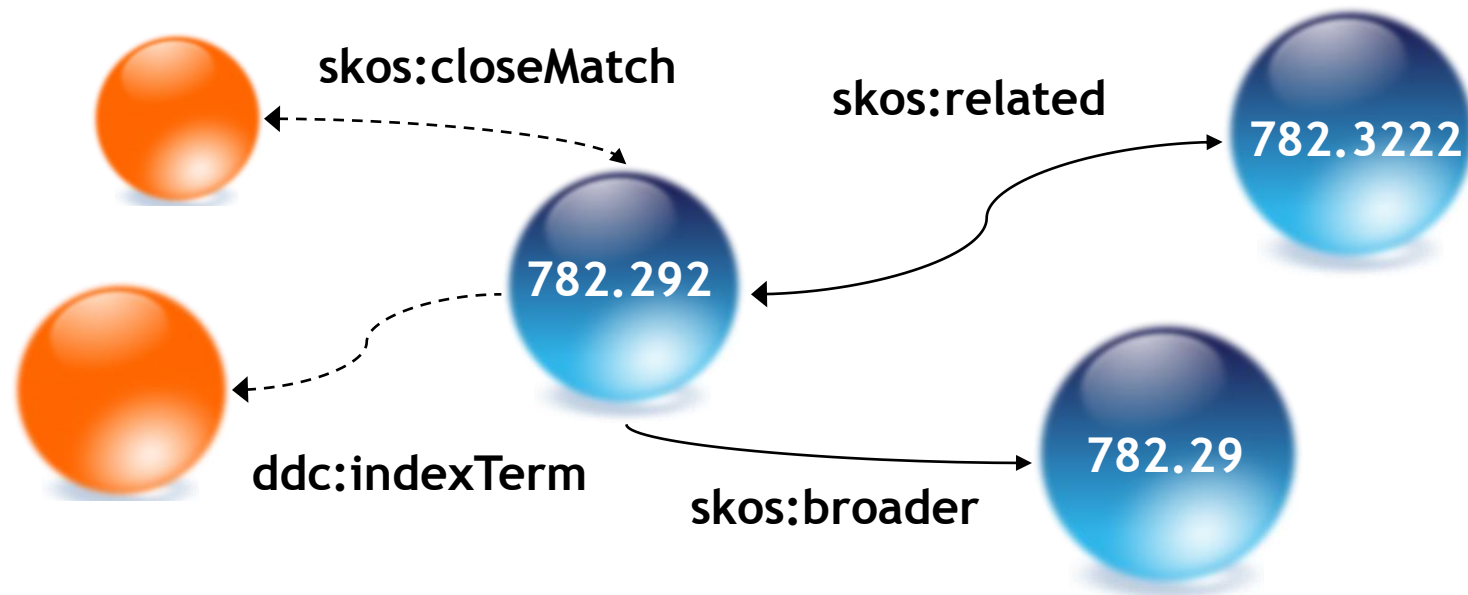
- Basic distinction of classes and topics difficult with representational models like SKOS
- Dewey classes as instances of *skos:Concept* become individuals (“primitives”) of the domain
- Some power of the formalization is lost



# Representation of neighborhoods (2)

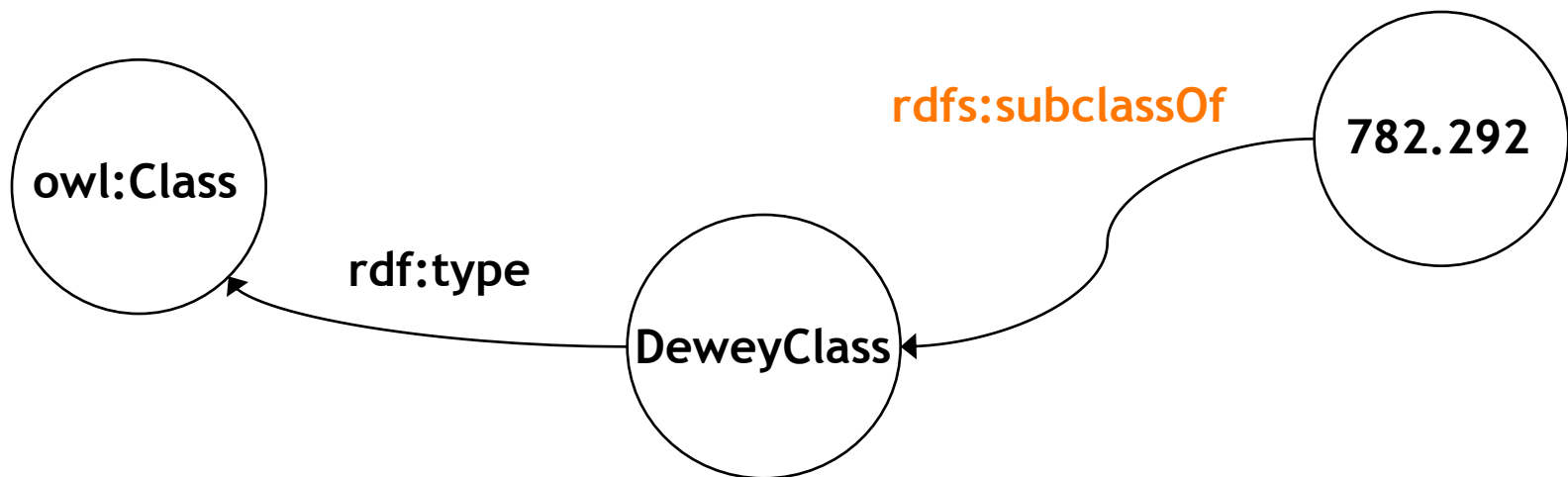


- Only interclass relationships can be asserted at this level
- Without subclasses (no *isA* relationship), inference ability is severely limited



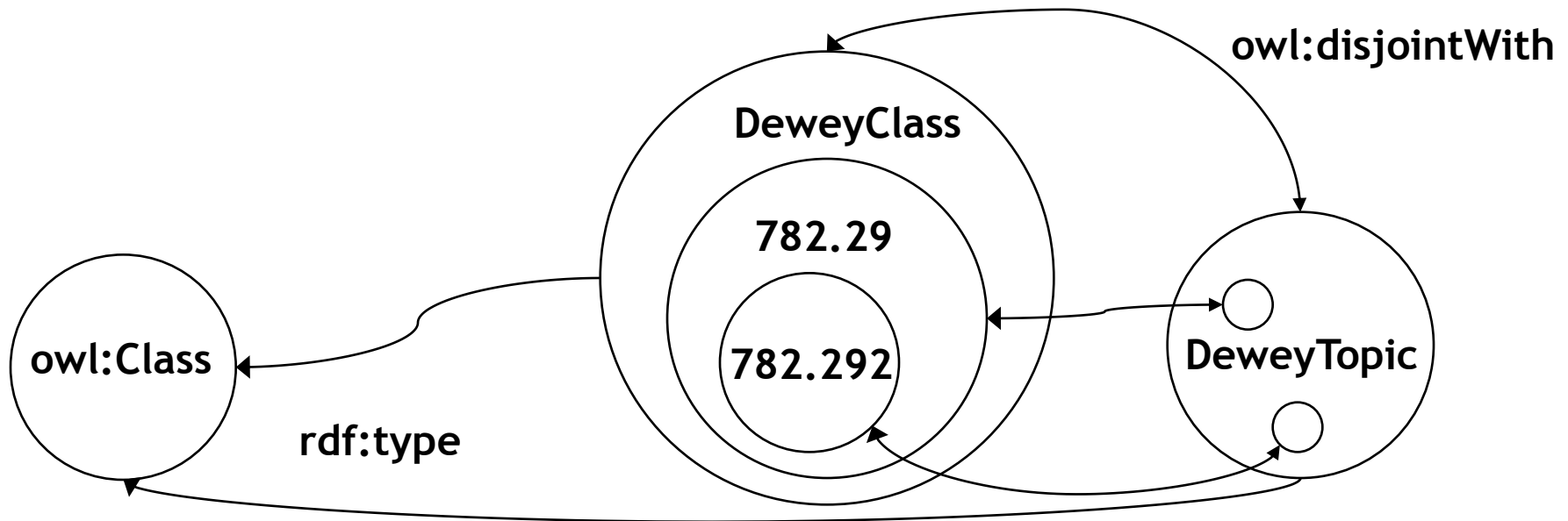
# Representation of neighborhoods (3)

- Conceptualizing Dewey classes as ontological classes (instances of owl:Class) allows for more expressivity



# Representation of neighborhoods (4)

- Class descriptions constrain class extension with class axioms
- Class axioms describe conjunctively the topical extent of a Dewey class
- Properties can be combined with other entities as specific types of description to build relationships



# Representation of neighborhoods (5)



- Disjoint classes in domain: DeweyClasses, DeweyTopics
- Interclass relationships expressed with subsumption relations
  - OWL 2 provides property chain inclusion for complex situations
- Class-topic relationships expressed as OWL class axioms with domain of DeweyClass and range of DeweyTopic
  - Subtractive features construed as inclusion of negation of topic
  - Open world assumption: exclusions have to be made explicit
  - Limited inference of topics in class neighborhood possible

# Representation of neighborhoods (6)



- But KOS are not formal KR languages
  - Class descriptions are seldom necessary *and* sufficient ( $\equiv$ )
  - Dealing with incomplete information diminishes entailment and inference possibilities
  - Complex interplay of classes and topics unlikely to be reflected completely
- Multilevel approach is necessary
  - Formalizing coarse relationships while avoiding production of inconsistencies with the underlying structure
  - Emphasis on knowledge reuse

- **Graphical representations of classes**
  - Classes not just topic points in graph, but set of focal topics + neighborhoods
- **DDC classes as neighborhoods**
  - Neighborhoods developed through caption, notes; subsumption; hierarchical force; standing room topics; index/RI terms; diachronic development of DDC; full vs. abridged editions; rules for choice of number; classification of bibliographic resources



- **Representation of neighborhoods**
  - Model of classes as focal topics + neighborhoods in alignment with paradigms of formal ontology languages
  - Certain means of developing neighborhoods can be translated into ontological class axioms
  - Certain types of interclass relationships (e.g., subsumption) have different semantic implications in DDC vs. ontology languages like OWL