⊃ terrain object is located under another terrain object*
⊃ terrain object is located closer than another terrain object*
⊃ terrain object is located further than another terrain object*

relation of the main directions of terrain objects
⊂ oriented relation
:= [allows determining which main direction one terrain object occupies in relation to another terrain object]
⊃ *terrain object in relation to another terrain object occupies the main north direction**
⊃ *terrain object in relation to another terrain object occupies the main north-east direction**
⊃ *terrain object in relation to another terrain object occupies the main east direction**
⊃ *terrain object in relation to another terrain object occupies the main south-east direction**
⊃ *terrain object in relation to another terrain object occupies the main south direction**
⊃ *terrain object in relation to another terrain object occupies the main south-west direction**
⊃ *terrain object in relation to another terrain object occupies the main west direction**
⊃ *terrain object in relation to another terrain object occupies the main north-west direction**

metric spatial relation
:= [characterizes information about the distance between terrain objects]
⇒ *measurement**:
kilometer
⇒ *measurement**:
meter
⊃ *scale metric spatial relation*

metric spatial relation
:= [coordinate system used to determine the location of objects on the Earth]
∋ example′:
WGS84
:= [The world system of geodetic parameters of the Earth, 1984, which includes a system of geocentric coordinates, and unlike local systems, it is a single system for the entire planet]
∋ example′:
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V. FORMALIZATION OF TOPOLOGICAL SPATIAL SEMANTIC RELATIONS IN GEOINFORMATION SYSTEMS

Between instances of terrain objects, it is possible to establish topological spatial relations:

topological spatial relation
:= [spatial relation class, defined over terrain objects that are in relation of connectivity and adjacency between terrain objects]
∋ *inclusion**
⊃ *inclusion of a point terrain object in an area terrain object**
⊃ *inclusion of a linear (multilinear) terrain object in an area terrain object**
⊃ *inclusion of an area terrain object in an area terrain object**
∋ *border***
∋ *intersection**
⊃ intersection of two linear (multilinear) terrain objects*
⊃ intersection of linear (multilinear) and area terrain objects*
⊃ *adjacency**

The "inclusion*" relation will be set between *area* and *linear*, *area* and *point*, *area terrain objects*. The "intersection*" relation will be set between *linear* and *area* and *linear terrain objects*. The "border*" relation will be established between *area terrain objects*. The "adjacency*" relation is established between *linear terrain objects*. For all *cartographic relations*, there are structures for storing them.

VI. SUBJECT DOMAIN AND ONTOLOGY OF TERRAIN OBJECTS

For the purpose of *integration of subject domains* with spatial components of *geoinformation systems*, respectively increasing *interoperability* of these systems, a *hybrid knowledge model* is proposed. By this model we will understand a *stratified model of the information space of terrain objects* described in the work [11].

terrain object
⇒ *subdiving**:
Typology of terrain objects by topic
= {• water terrain object (facility)
• populated terrain object
• industrial (agricultural or sociocultural) terrain object
• road network (facility)
• vegetation cover (soil)
}

The basis for building the ontological model of *terrain objects* is grounded on the classifier of topographic information displayed on topographic maps and city plans developed and currently functioning in the *Republic of Belarus* [12]. In accordance with this circumstance, the objects of classification are the *terrain objects* to which the map objects correspond, as well as the signs (characteristics) of these objects. For this purpose, in the ontological model, terrain objects are divided by