localization type into: *area objects^ linear (multilinear) objects^*, and *point objects^* .

At the next stage of developing the ontology of *terrain objects*, we will set the subdivision of *terrain objects* on orthogonal bases, which corresponds to the placement of objects in accordance with thematic layers in *geoinformation systems*.

For each *terrain object*, the main semantic characteristics inherent only to it are highlighted. It should be particularly noted that metric characteristics do not have such a property. According to this classifier, each class of *terrain objects* has a unique unambiguous designation. The classifier hierarchy has eight classification stages and consists *of the class code, subclass code, group code, subgroup code, order code, suborder code, species code, subspecies code*. Thus, thanks to the coding method, generic relations have already been defined, reflecting the correlation of various *terrain object classes*, and the characteristics of a specific *terrain object class* have also been established. Due to the fact that the basic properties and relations are set not of specific *physical objects* but of their classes, then such information is meta-information in relation to specific *terrain objects*, and the totality of this meta-information is an ontology of *terrain objects*, which in turn is part of the *knowledge base* of the *intelligent geoinformation system*.

terrain object
⇒ *subdividing*:*
Typology of terrain objects by localization
^
= {
- point terrain object
  ⇒ inclusion*:
  - well
  - light post
- linear terrain object
  ⇒inclusion*:
  - bridge
- multilinear terrain object
  ⇒inclusion*:
  - river
  - road
- area terrain object
  ⇒inclusion*:
  - lake
  - administrative area

}

VII. SPECIFICATION OF THE MAP LANGUAGE

The *Map Language* belongs to the family of semantic compatible languages – *sc-languages* – and is intended for the formal description of *terrain objects* and the relations between them in *geoinformation systems*. Therefore, the **Map Language Syntax**, like *syntax* of any other *sclanguage*, is the *Syntax* of the *SC-code*. This approach allows:

- using a minimum of means to interpret the specified *terrain objects* on the map;
- using the *Question Language for ostis-systems*;
- reducing the search to most of the given *questions* to searching for information in the current state of the *ostis-system knowledge base*

Denotational semantics of the Map Language includes the *Subject domain and the ontology of terrain objects* and *their geosemantic elements*.

VIII. AUTOMATION TOOLS FOR THE INTELLIGENT GEOINFORMATION SYSTEMS DESIGN

The design of intelligent geoinformation systems is carried out in stages. At the first stage, the knowledge base of the subject domain is formed and for this purpose an electronic map (voluntary cartographic information) is analyzed and translated into the knowledge base of terrain objects with the establishment of geosemantic elements for the corresponding territory. At this stage, it is determined, firstly, to which class the terrain object under study belongs and, further, depending on the type of object, the concept of a knowledge base corresponding to a specific physical terrain object is formed. Thus, many concepts are created that describe specific terrain objects for each class of terrain objects. It should be noted that it is at this stage of the formation of the knowledge base that semantic elements are established. At the second stage of designing an intelligent geoinformation system, the knowledge base obtained at the first stage is integrated with external knowledge bases. At this stage, in addition to geographical knowledge, knowledge of related subject domains is added, thereby it becomes possible to establish interdisciplinary connections. An illustrative example is integration with biological classifiers, which in implementation represent an ontology of flora and fauna objects. Such integration expands the functional and intelligent capabilities of the applied intelligent geoinformation system. Note that at this stage, homonymy is removed in the names of geographical objects belonging to the classes of settlements. For settlements of the Republic of Belarus, this is achieved by using the *system of designations of administrative-territorial division objects and settlements* and semantic comparison of geographical terrain objects is carried out according to the following principle:

- the terrain object class is determined;
- the terrain object subclass, species, subspecies, etc. is determined in accordance with the classifier of terrain objects, i.e. types of terrain objects in the ontology;
- the attributes and characteristics that are inherent in this terrain object class are determined;
- the values of the characteristics for this object class are determined;
- the homonymy of identification is eliminated;