Chapter 5
MOF–Metamodels and Formal Languages

A BRIDGE BETWEEN MOF-METAMODELS AND NEREUS

This chapter describes how to automatically translate MOF metamodels into NEREUS (Favre, 2005) (Favre, Martinez, & Pereira, 2005). We describe a bridge between MOF metamodels and NEREUS based on reusable schemes and a system of transformation rules. We consider MOF metamodels that are expressed by UML class diagrams, packages diagrams and OCL specifications.

The text of a NEREUS specification is completed gradually. Figure 1 shows the main steps of this transformation. First, the signature and axioms are obtained by instantiating the reusable scheme BOX. Next, associations are transformed by instantiating reusable schemes that exist in the component Association. Finally, OCL specifications are transformed using a set of transformation rules. Then, a specification that reflects all the information of UML diagrams is constructed.

Following we describe the transformation of a basic package (that does not depend on others) including only classes and relationships. Following sections describe how to transform basic classes and associations. The transformation processes is supported by reusable schemes and a system of transformation rules for translating OCL specifications into NEREUS.

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Figure 1. Transforming MOF metamodels into NEREUS

Figure 2 depicts the different ways in which a class A may be related in a MOF metamodel: generalization, dependency, aggregation, composition and binary associations. Figure 2 shows in an only box several relations, for instance, the class A is associated with the classes $D_1, D_2, \ldots, D_k$ or is composed by the classes $C_1, C_2, \ldots, C_k$. It can be transformed in part of a NEREUS specification by instantiating the following scheme Class_

```
CLASS __
IMPORTS F1, F2, \ldots, Fk
INHERITS B1, B2, \ldots, Bk
Box_ [...:attr1;...:attri;...:meth1;..:methi,..]
ASSOCIATES <<Aggregation-E1>>
ASSOCIATES <<Aggregation-E2>> ...
ASSOCIATES <<Composition-C1>>
ASSOCIATES <<Composition-C2>>...
ASSOCIATES <<Association-D1>>
ASSOCIATES <<Association-D2>>
AXIOMSEND-CLASS
```

Figure 2. MOF relationships
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