Numerical .NET

## Project Introduction

This is a C#.NET program for mathematical (numerical, particularly) calculation tasks. Unlike most numerical libraries, Numerical .NET starts from algebraic systems, so that applications of numerical algorithms are not limited within the range on real or complex numbers. It deals with elements in algebraic sets, using the very operational rules in which could be customized defined, instead of real or complex numbers with ordinal operators.

In package “Common”, various interfaces are provided as the definitions of fundamental algebraic structures (such as groups, rings, fields, linear sets, relational sets and etc.). Further structures could be defined by inheriting them. For example, an invertible matrix set is a field, as well as a normed, metric linear space with inner product operation. So we can define it by inheriting interfaces IField, ILinear, INormed, IMetric, and IInnerproducted.

With this definition system, our algorithms’ parameters could be defined as an abstract type, instead of the naive types like “double”, “complex”, “vector” or “matrix”.

## Functions

Hyper abstract data type definition structure.

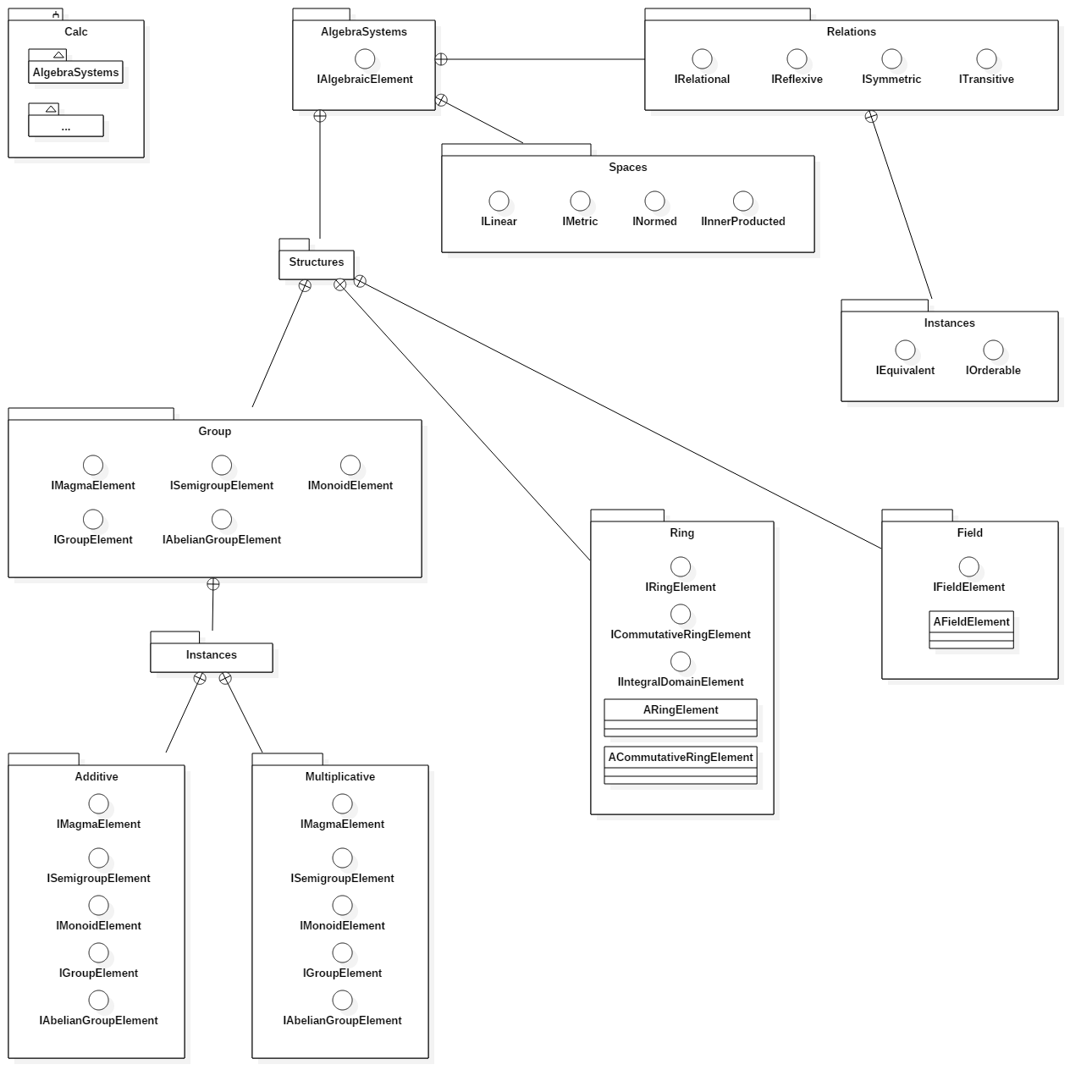
Numerical algorithms suitable for abstract types.

Calculation algorithms more than numerical.

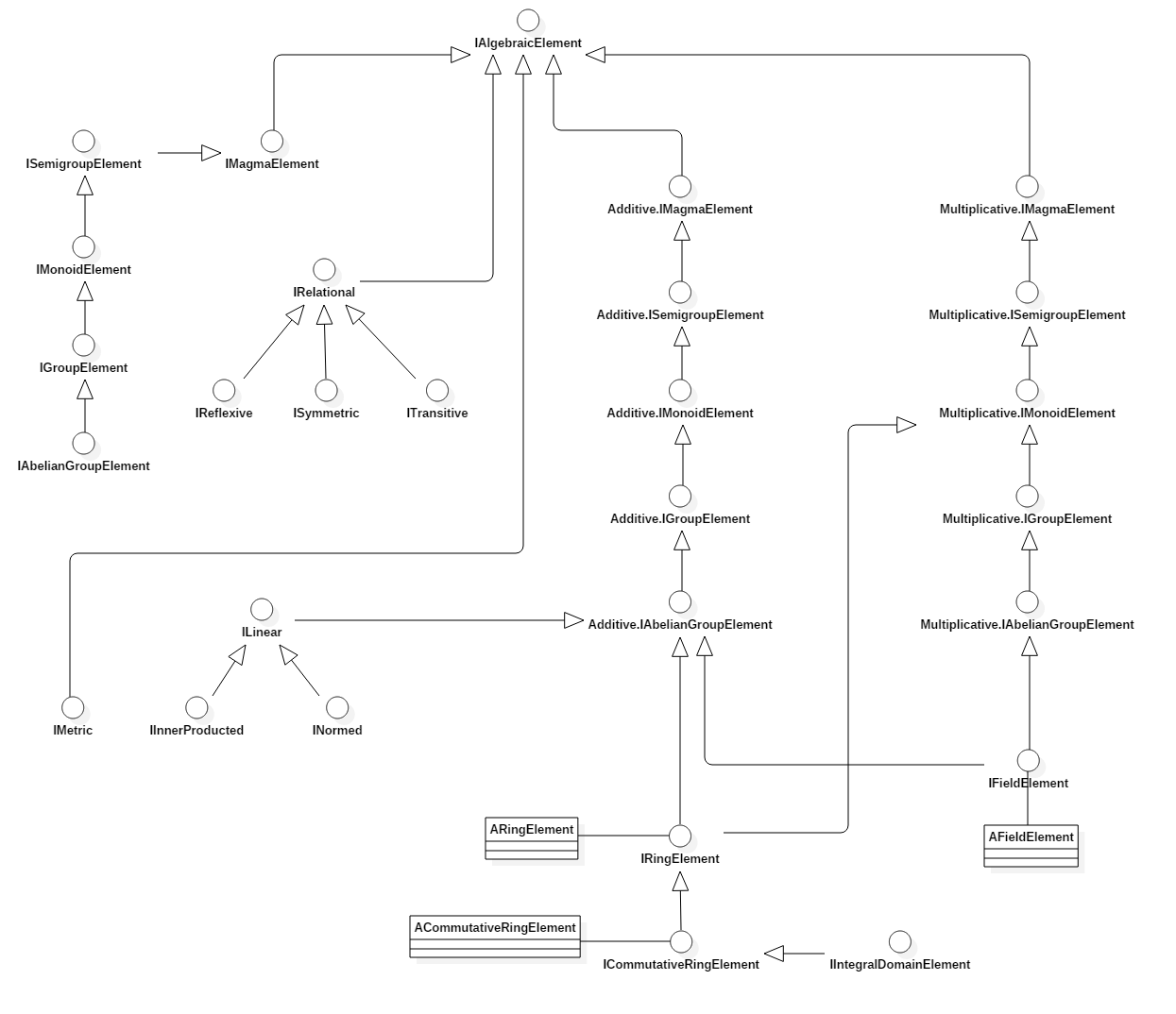
## Design

### Model [AlgebraSystems]

UML diagram – Packages



UML diagram – Interfaces



UML diagram – Methods in Interfaces

