

## Topics.

### 1. Building and Manipulating Sparse Matrices.

Usage of the function **SparseArray** to construct in some seconds very large and sparse matrices. Further manipulation of them.

A realistic example – **The DOPI3** and **DOPI3R**  
(Quantum Chemistry).

### 2. Connecting Fortran, C++ and Mathematica.

A small introduction to **MathLink**.

A realistic example – **The DOPI3** and **DOPI3R**  
(Quantum Chemistry).

### 3. Lists Manipulation.

Manipulating very large dense matrices.

A realistic example – **A Quantum Computer Simulator**  
(Artificial Intelligence).

### 4. Symbolic Programming.

Setting up rules about symbolic integration of the **Vector Spherical Harmonics**.

Production of **new - completely unknown** - scientific formulas.

A realistic application – **Integrating the Maxwell Stress Tensor**  
(Classic Electrodynamics).