

Almost every real-word problem have to solved may times

Parametric sweep

- Change one or more input parameter and see what happens

Optimization

- Define the space of input parameters and find an optimal combination

Tolerance Analysis

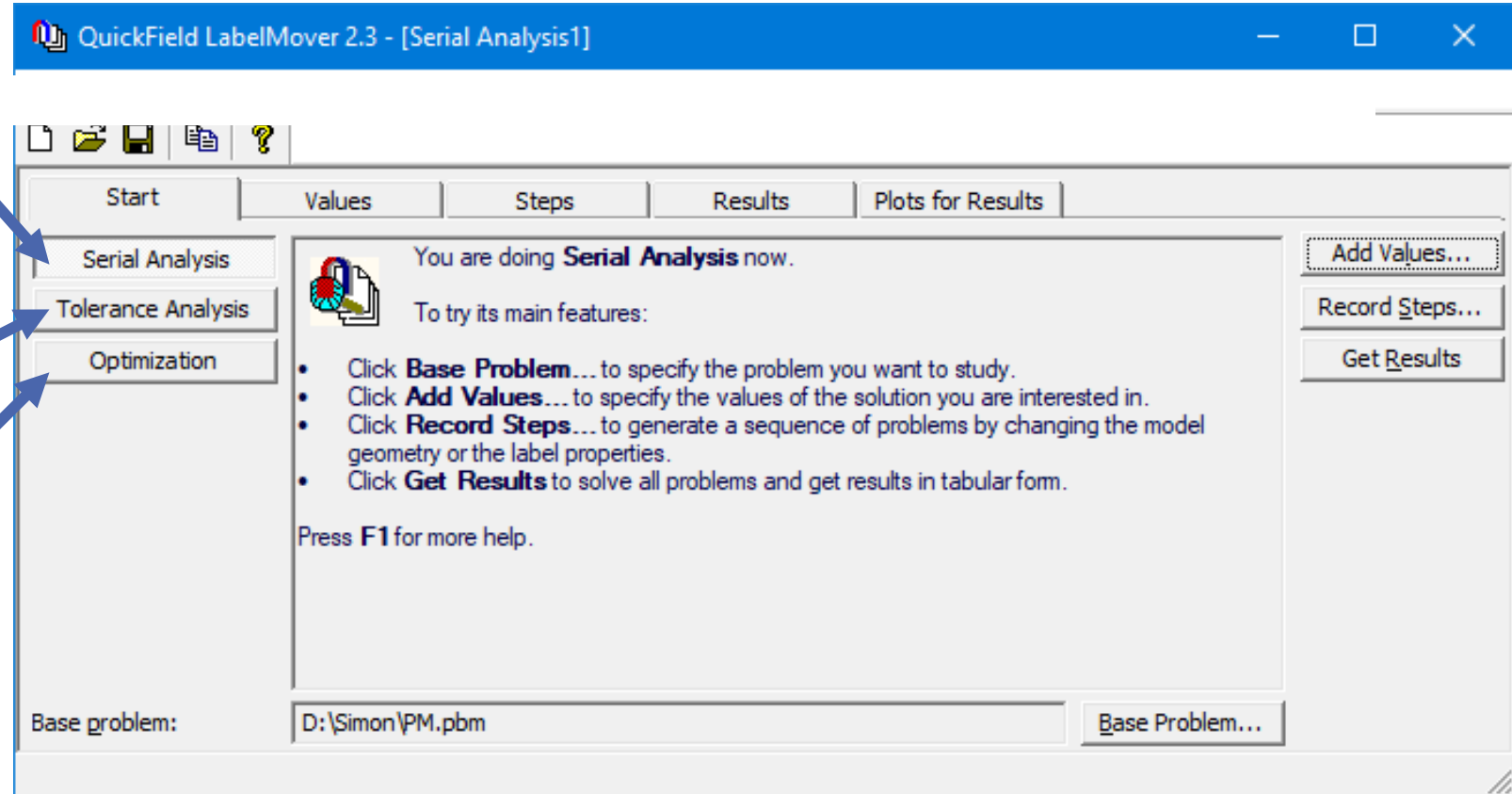
- If some of input parameters are know in non-exact way, it is interesting to know what is the statistical parameters of output

The tool for parametric analysis: LabelMover

Parametric
sweep

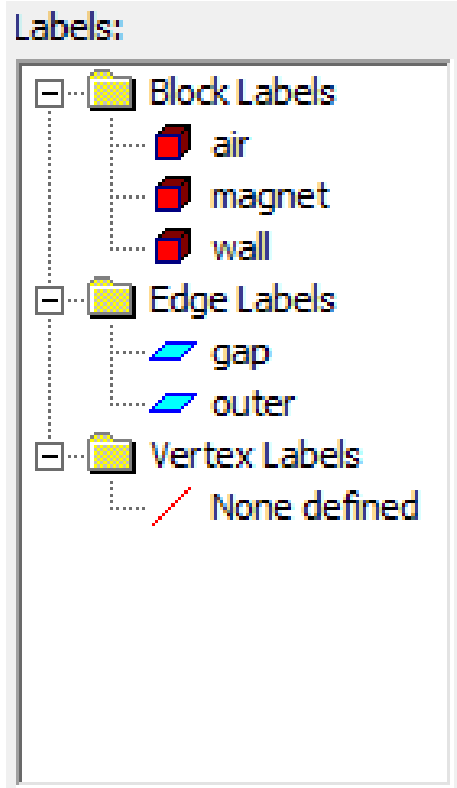
Optimization

Tolerance
Analysis



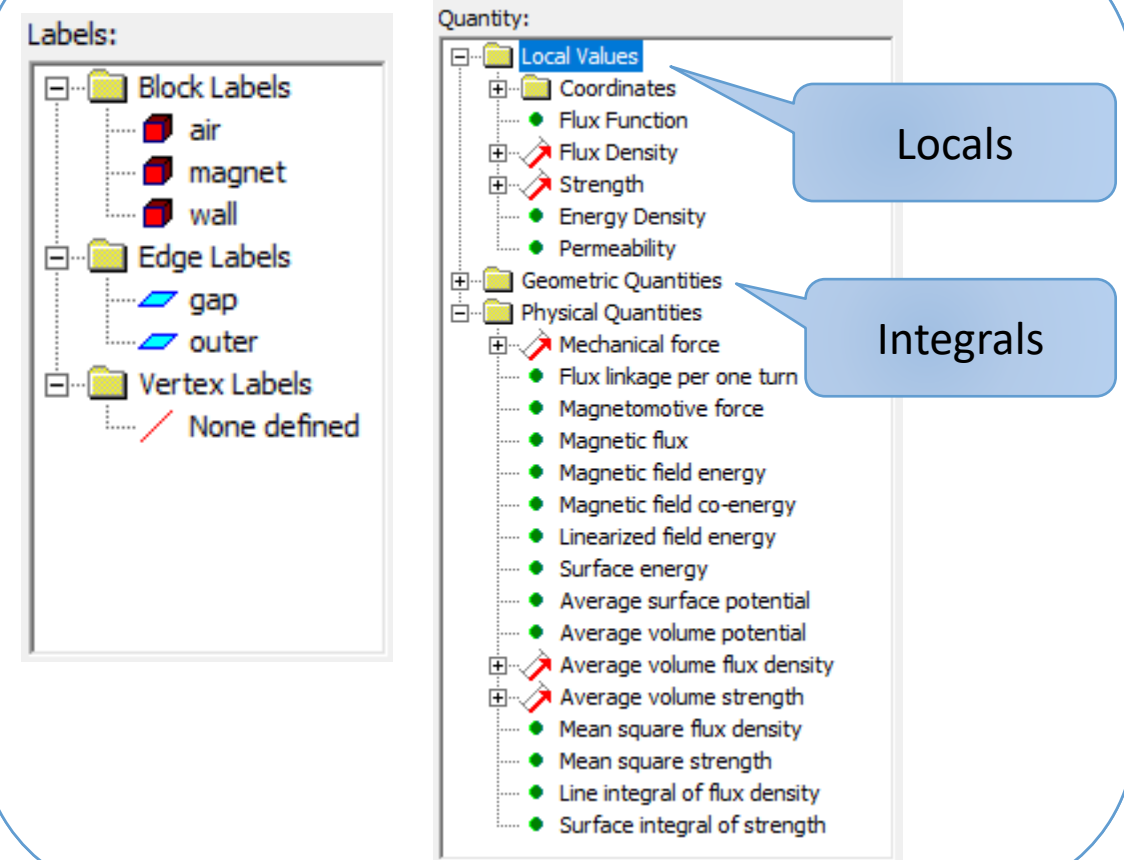
What serial analysis does?

1. Perform STEPS

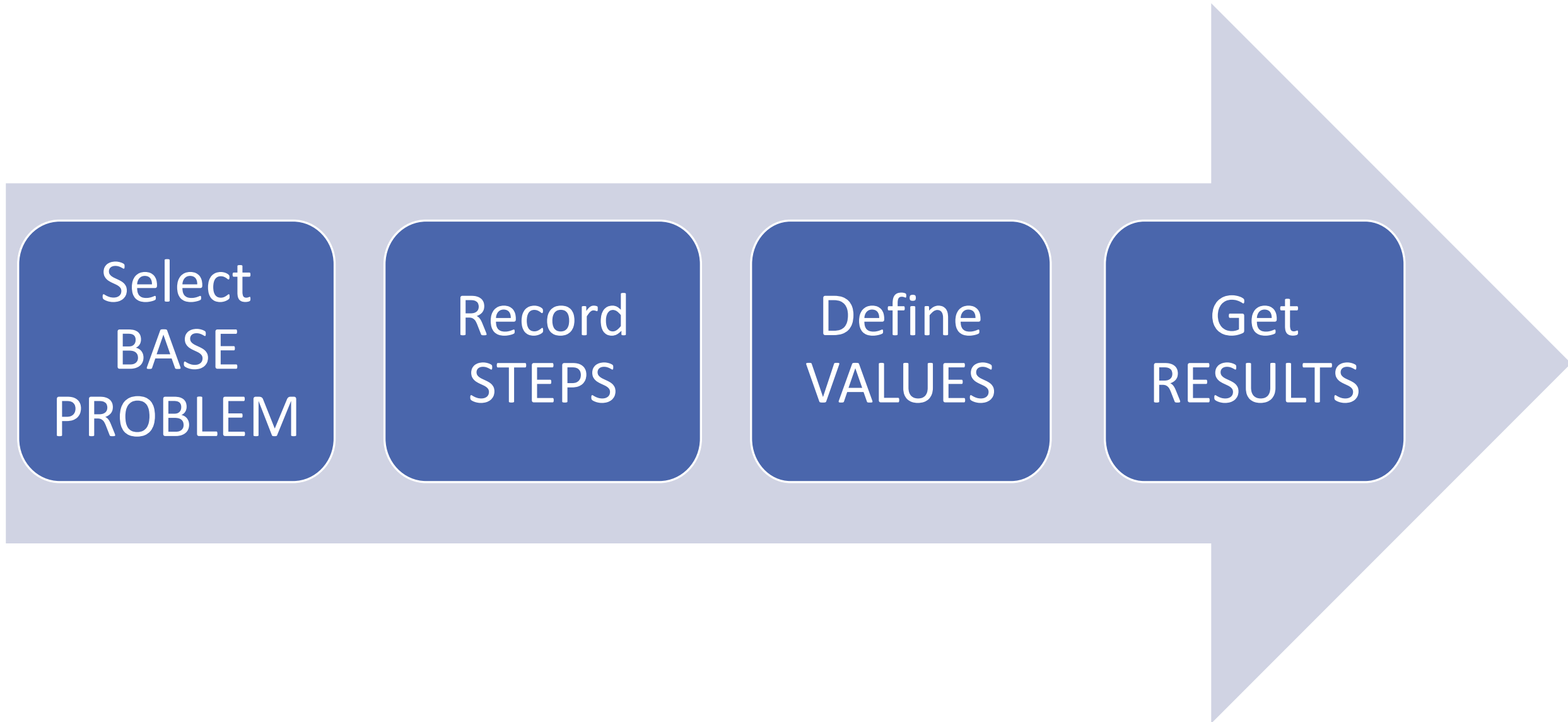


- **Move parts**
 - Block
 - Edge
 - Vertex
- **Change properties**
 - Problem property
 - Label Property

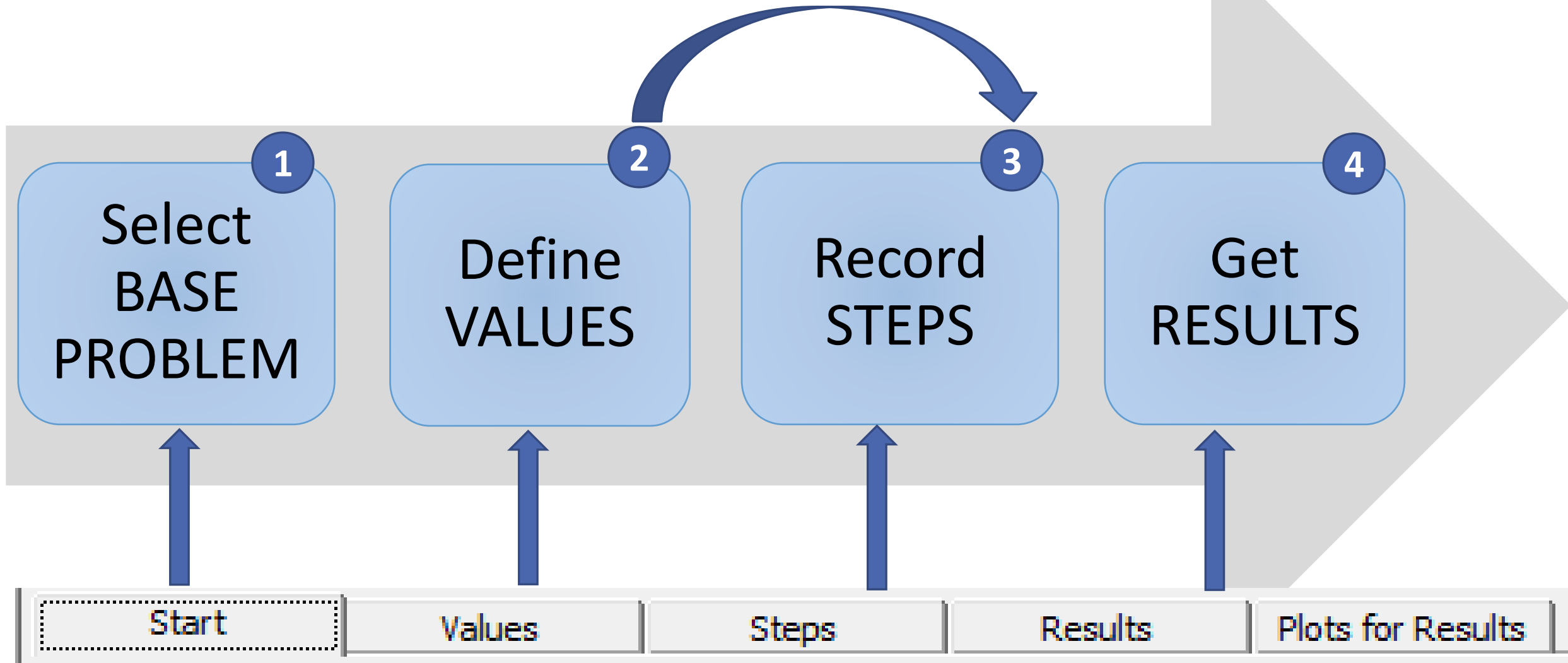
2. Calculate VALUES



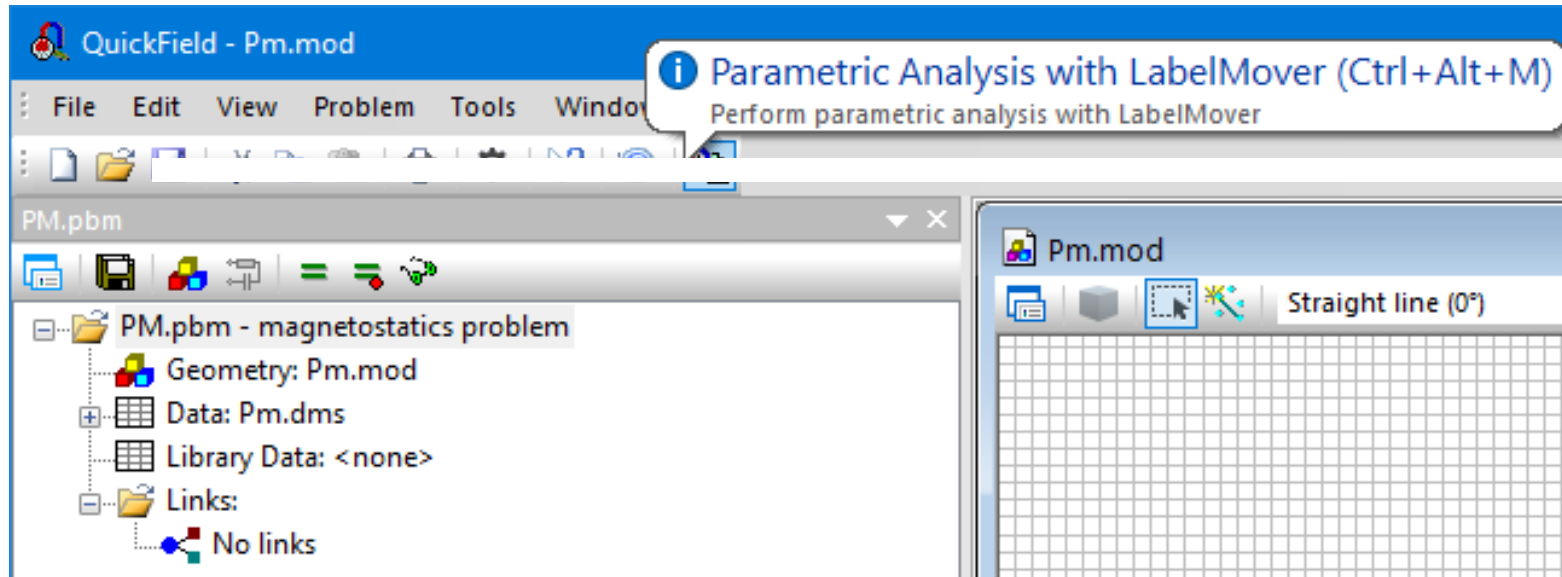
Workflow with LabelMover



Workflow with LabelMover



1. Choose the base problem

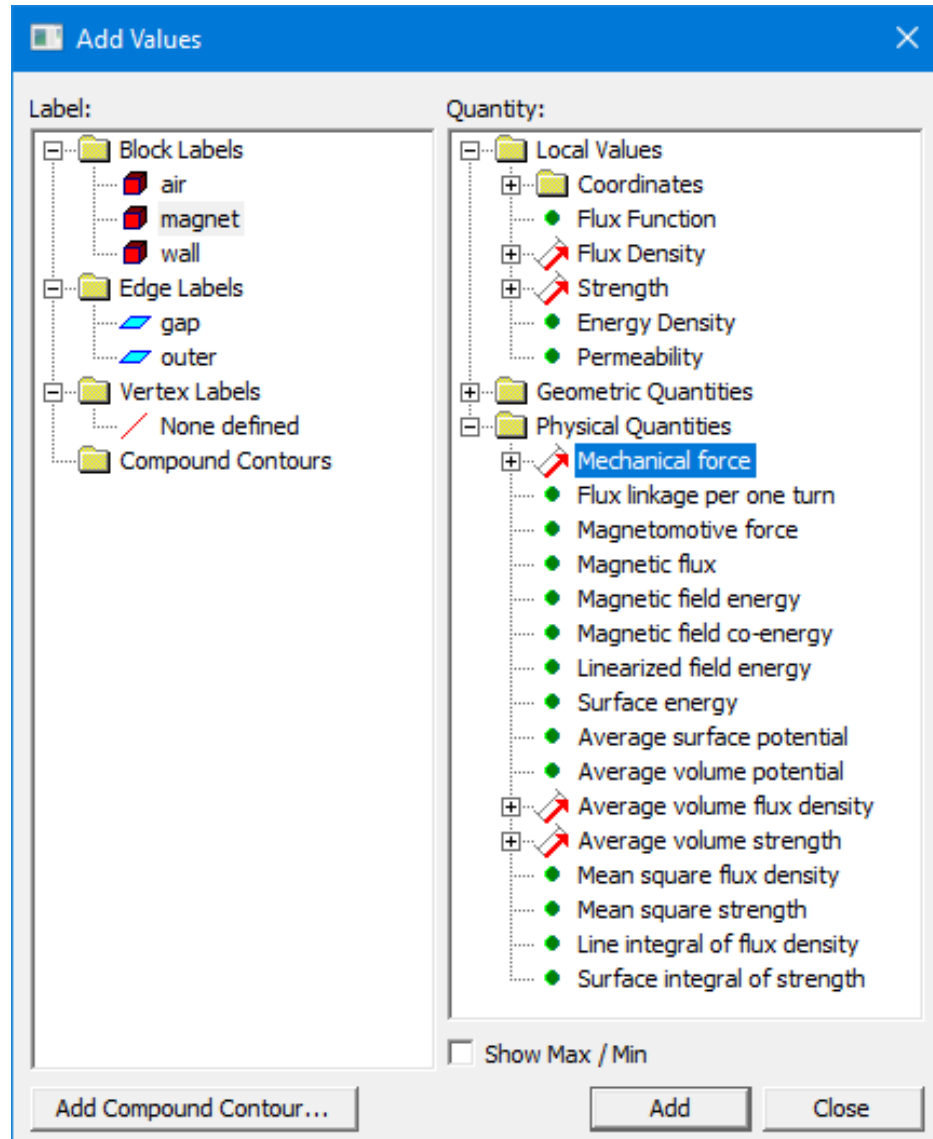


1. If LabelMover starts with a toolbar button, the current problem is automatically selected as a base



2. Otherwise use the Base Problem button

2. Define stored values



1. Local values

- On what point (only labeled vertices accepted)
- What quantity (coordinates, potential, field vectors, material data)

2. Integral values

- On what contour (labeled edge, labeled block or compound contour)
- What quantity (choose from the list of available integrals)

3. Record STEPS

STEP is an elementary action changes the model: data or geometry.
After each step LabelMover solve the problem and calculates values.

1. Change Property step

- Change problem property (frequency)
- Change label property (material data, source, boundary condition)

2. Move step

Moves the geometry entity (block, edge, vertex) by:

- Displacement
- Rotation
- Scaling

3. Record STEPS (continue)

1. Substeps

Substeps are used when:

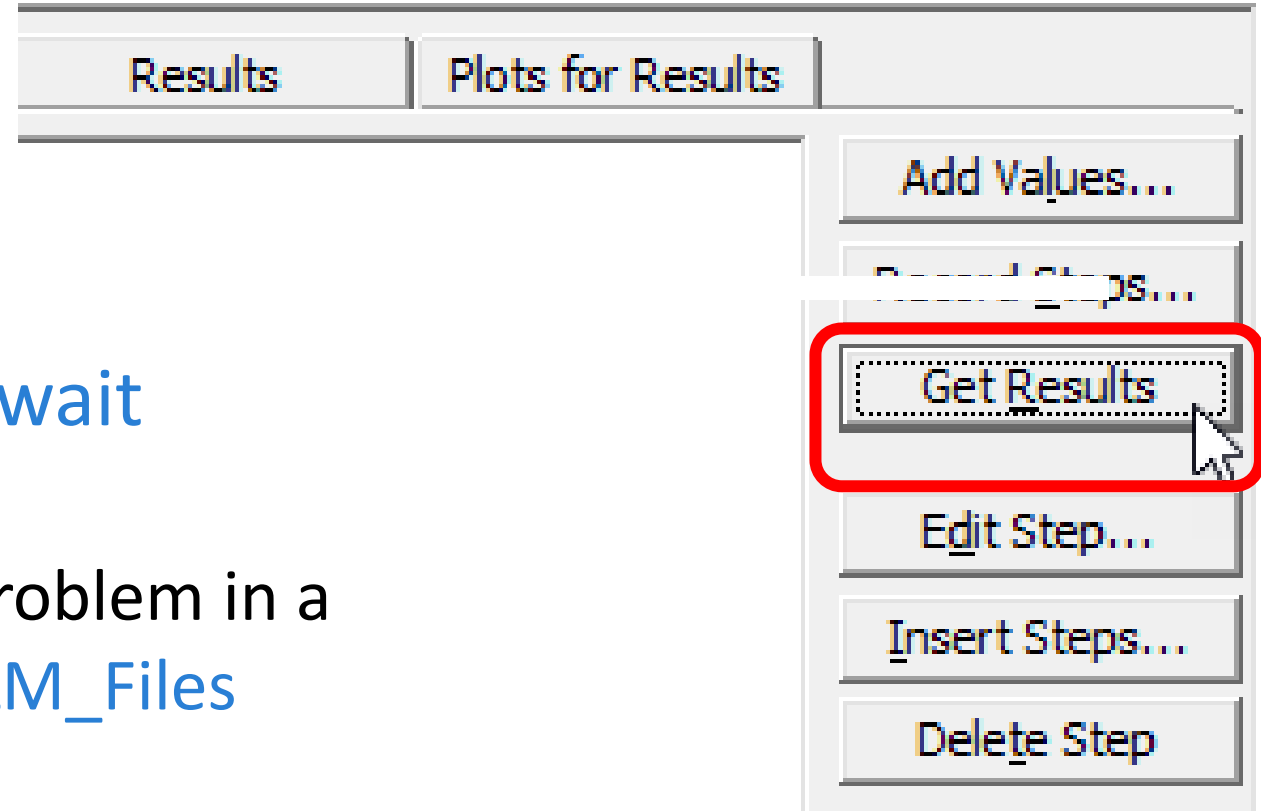
- Geometry or data transformation involve more than one label
- Moving involves several elementary operation

2. Repeating steps

Each step can be automatically repeated:

- Given number of times
- While possible
- Step repetition can be manually aborted (Cancel button)

4. Getting result



Press the Get Result button and wait

- LabelMover saves generated problem in a subfolder `<ProblemName>_QLM_Files`
- Several problems are solved in parallel
See [Tools / Options](#) command

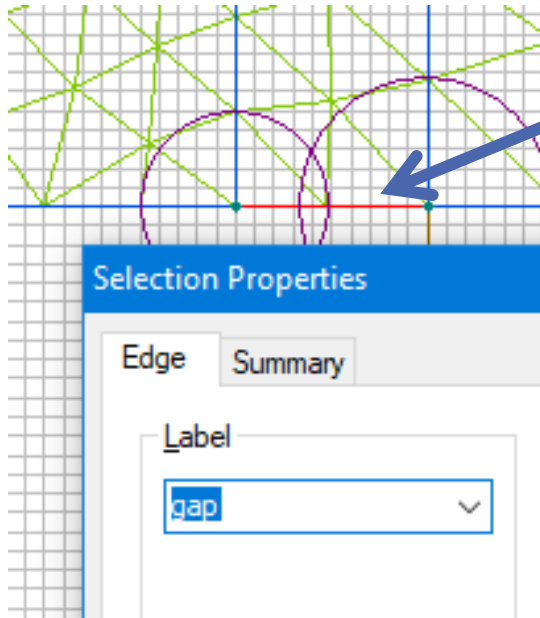
Example: Permanent Magnet

Goal: Force vs. distance dependency

1. Prepare the base problem.

Name everything that will be measured or changed:

- Plan the contour of integration, pre-create them if needed
- Plan input and output values, give names for measuring



This edge serves
for measuring
the distance
from magnet to
wall

Note:

Do not forget to solve the base problem after preparing it

Example: Permanent Magnet

Result: Force vs. distance dependency

QuickField LabelMover 2.3 - [Serial Analysis1]

File Edit View Tools Help

Start Values Steps Results

Step	Contour length ...	Mechanical force ...
0	0.02	2.6236
1	0.03	2.491
1_2	0.04	2.3752
1_3	0.05	2.2749
1_4	0.06	2.1831
1_5	0.07	2.0983
1_6	0.08	2.0228

Add Values...
Record Steps...
Get Results
View Model
View Field
View Contours...

