



# The new version of the FUMILIM minimization package



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## ABSTRACT

The suggested package FUMILIM, based on famous FUMILI minimization package, has the following advantages: multi-optional user interface; speed advantage when the number of parameters is high enough; there are options to ignore wrong experimental points and correct experimental errors. The preliminary scan is envisaged for complicated tasks.

The new version of FUMILIM is capable to work efficiently with multidimensional experimental points, described by a vector function.

For heavy user's functions the parallel fit is envisaged by means of OpenMP service.

The package contains intrinsic user's functions, namely, polynomial, sum of Gauss and sum of Rayleigh functions. All of them can be used without the definition of the parameter initial values.

The program of plane track reconstruction via drift chambers and straws, which can be combined with single detectors, is also included in the package. The capacity of this program is about of  $0.5 \cdot 10^6$  tracks per second (at 2.8 GHz).

There is a number of less important improvements of the package.

All programs are written in FORTRAN-90.

The investigation has been performed at the Veksler and Baldin Laboratory of High Energy Physics, JINR.

### New version program summary

Program Title: FUMILIM\_v2

Program Files doi: <http://dx.doi.org/10.17632/xphc8ctxr3.1>

Licensing provisions: GPLv3

Programming language: Fortran-90

Journal reference of previous version: Comput. Phys. Comm. **185** (2014) 599–603

Does the new version supersede the previous version?: Yes.

Reasons for the new version: to extend the class of solvable tasks.

Summary of revisions:

- Now the program can work with multidimensional experimental points, described by vector functions.
- For time consuming user functions it is possible to carry out parallel count by using OpenMP service.
- When the array of experimental points is subdivided in groups, FUMILIM now automatically detects these subdivisions.
- A number of popular user's functions is included as intrinsic in the package.

Nature of problem: To minimize  $\chi^2$ -functional.

Solution method: Least square method.

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