The Direct-Inverse-Solver (DiInSo) software package is orient to solve direct 3D and inverse 2D/3D electrical resistivity tomography (ERT) problems on direct current (DC). The 32-bit version of the program is free for academic research, differs little from the 64-bit version and has no limitations except for the natural constraint of any 32-bit application (the maximum amount of random access memory (RAM) which can be used by the application is limited to 2 Gigabytes).

DiInSo written in C/C++ programming language and use multi-threaded algorithms, which allows you to use full power of your computer. Despite the Windows-based interface, the program code does not have a rigid binding to the operating system, which allows compiling the program for other modern systems, including Linux-like ones, if necessary.

Distinctive features of DiInSo are:

- The use of tetrahedral (or triangular in the 2D case) meshes when solving both direct and inverse problems of ERT, which allows you to specify the geometries of areas of any complexity;
- A wide range of options for solving direct and inverse problems of ERT, with which you can adjust the solution algorithm for specific purposes;
- Built-in graphical visualizers, using which the user get first assesses of the results, without leaving the program;
- Detailed documentation in English with examples that will allow you to learn the program in a few days without absorbing in a complex theory;
- The ability to convert input data from other ERT software systems to the DiInSo program format;
- The connectivity of the DiInSo software with well-proven OpenSource projects, which allows developing DiInSo with high speed;
- The ability to use many of the DiInSo software options in “automatic mode” for novice users who have not yet learned all the features of this options.

To solve the direct problems of ERT user must learn at least one of the following tetrahedral mesh generation programs:

- Netgen Mesh Generator (MS Windows and Linux) — freeware, website: https://ngsolve.org/
- Gmsh (MS Windows and Linux) — freeware, website: http://gmsh.info/
- GiD (MS Windows and Linux) — commercial, website: https://www.gidhome.com/
- SALOME (MS Windows and Linux) — freeware, website: http://www.salome-platform.org/

To solve inversion problems with complex geometries and/or object inclusions, it is desirable to understand the input data formats used in free triangular mesh generator “Triangle” (https://www.cs.cmu.edu/~quake/triangle.poly.html) and tetrahedral mesh generator “TetGen” (http://wias-berlin.de/software/tetgen/fformats.poly.html).

For a detailed analysis of the inversion output data, it is recommended to use any program that works with VTK and/or VTU formats (https://vtk.org/), for example, freeware ParaView (https://www.paraview.org/), VisIt (https://wci.llnl.gov/simulation/computer-codes/visit), Cassandra (http://dev.artenum.com/projects/cassandra) or commercial Tecplot (http://www.tecplot.com/).

Please note that this project is under development, and therefore it is possible that there are small, medium, large and even critical errors that you can report to the chief programmer to speed up the errors correction and development process. New versions of the program with bug fixes, supplemented documentation and advanced functionality appear on the DiInSo program page of the SourceForge website:

https://diinso.sourceforge.io/

The mirror of the program is available on the GitHub website page:

https://github.com/Arkadiy1983/DiInSo

Some screenshots of the DiInSo program:

- Main Window:
https://a.fsdn.com/con/app/proj/diinso/screenshots/DiInSo_main.png
- Electrodes Array Generator Window:
https://a.fsdn.com/con/app/proj/diinso/screenshots/DiInSo_array.png
- Matrix Portrait Window:
https://a.fsdn.com/con/app/proj/diinso/screenshots/DiInSo_matrix.png
- Apparent Resistances Window:
https://a.fsdn.com/con/app/proj/diinso/screenshots/DiInSo_appres.png
- 2D Inversion Result Window:
https://a.fsdn.com/con/app/proj/diinso/screenshots/DiInSo_2dinv.png
- 3D Inversion Result Window:
https://a.fsdn.com/con/app/proj/diinso/screenshots/DiInSo_3dinv.png