# GMSH\_IO  Read and Write GMSH Mesh files

**GMSH\_IO** is a FORTRAN90 library which can read and write the files used by the GMSH meshing program.

### Licensing:

The computer code and data files made available on this web page are distributed under [the GNU LGPL license.](https://people.sc.fsu.edu/~jburkardt/txt/gnu_lgpl.txt)

### Languages:

**GMSH\_IO** is available in [a C version](https://people.sc.fsu.edu/~jburkardt/c_src/gmsh_io/gmsh_io.html) and [a C++ version](https://people.sc.fsu.edu/~jburkardt/cpp_src/gmsh_io/gmsh_io.html) and [a FORTRAN77 version](https://people.sc.fsu.edu/~jburkardt/f77_src/gmsh_io/gmsh_io.html) and [a FORTRAN90 version](https://people.sc.fsu.edu/~jburkardt/f_src/gmsh_io/gmsh_io.html) and [a MATLAB version](https://people.sc.fsu.edu/~jburkardt/m_src/gmsh_io/gmsh_io.html).

### Related Data and Programs:

[DOLFIN-CONVERT](https://people.sc.fsu.edu/~jburkardt/py_src/dolfin-convert/dolfin-convert.html), a Python program which can convert a mesh file from Gmsh, MEDIT, METIS or SCOTCH format to an XML format suitable for use by DOLFIN or FENICS, by Anders Logg.

[FEM\_TO\_GMSH](https://people.sc.fsu.edu/~jburkardt/f_src/fem_to_gmsh/fem_to_gmsh.html), a FORTRAN90 program which reads FEM files definining a 1D, 2D or 3D mesh, namely a file of node coordinates and a file of elements defined by node indices, and creates a Gmsh mesh file.

[GMSH](https://people.sc.fsu.edu/~jburkardt/examples/gmsh/gmsh.html), examples which illustrate the use of the Gmsh program, a 1D, 2D or 3D mesh generator that can create meshes suitable for use by the finite element method (FEM).

[GMSH\_TO\_FEM](https://people.sc.fsu.edu/~jburkardt/f_src/gmsh_to_fem/gmsh_to_fem.html), a FORTRAN90 program which reads a mesh data file created by the GMSH program and writes a pair of node and element files that correspond to the FEM format.

[MSH](https://people.sc.fsu.edu/~jburkardt/data/msh/msh.html), a data directory of examples of MSH files, the native 3D mesh format used by Gmsh.

[TETHEX](https://people.sc.fsu.edu/~jburkardt/examples/tethex/tethex.html), examples which illustrate the use of TETHEX, a C++ program which can read a Gmsh file defining a mesh of triangles or tetrahedrons, and subdivide the mesh into quadrilaterals or hexahedrons, which are suitable for use by the DEALII finite element program, by Mikhail Artemiev.

### Reference:

1. Christophe Geuzaine, Jean-Francois Remacle,  
   Gmsh: a three-dimensional finite element mesh generator with built-in pre- and post-processing facilities,  
   International Journal for Numerical Methods in Engineering,  
   Volume 79, Number 11, pages 1309-1331, 2009.

### Source Code:

* [gmsh\_io.f90](https://people.sc.fsu.edu/~jburkardt/f_src/gmsh_io/gmsh_io.f90), the source code.

### Examples and Tests:

* [gmsh\_io\_prb.f90](https://people.sc.fsu.edu/~jburkardt/f_src/gmsh_io/gmsh_io_prb.f90), a sample calling program.
* [gmsh\_io\_prb\_output.txt](https://people.sc.fsu.edu/~jburkardt/f_src/gmsh_io/gmsh_io_prb_output.txt), the output file.

### List of Routines:

* **CH\_CAP** capitalizes a single character.
* **CH\_EQI** is a case insensitive comparison of two characters for equality.
* **CH\_TO\_DIGIT** returns the integer value of a base 10 digit.
* **GET\_UNIT** returns a free FORTRAN unit number.
* **GMSH\_DATA\_READ** reads sizes from a GMSH file.
* **GMSH\_SIZE\_READ** reads sizes from a GMSH file.
* **GMSH\_MESH1D\_WRITE** writes 1D mesh data as a Gmsh file.
* **GMSH\_MESH2D\_ELEMENT\_DATA\_EXAMPLE** returns element data for the 2D example.
* **GMSH\_MESH2D\_ELEMENT\_SIZE\_EXAMPLE** returns element sizes for the 2D example.
* **GMSH\_MESH2D\_NODE\_DATA\_EXAMPLE** returns node data for the 2D example.
* **GMSH\_MESH2D\_NODE\_SIZE\_EXAMPLE** returns node sizes for the 2D example.
* **GMSH\_MESH2D\_WRITE** writes 2D mesh data as a Gmsh file.
* **GMSH\_MESH3D\_WRITE** writes 3D mesh data as a Gmsh file.
* **I4MAT\_COPY** copies an I4MAT.
* **I4MAT\_TRANSPOSE\_PRINT** prints an I4MAT, transposed.
* **I4MAT\_TRANSPOSE\_PRINT\_SOME** prints some of the transpose of an I4MAT.
* **R8MAT\_COPY** copies an R8MAT.
* **R8MAT\_TRANSPOSE\_PRINT** prints an R8MAT, transposed.
* **R8MAT\_TRANSPOSE\_PRINT\_SOME** prints some of an R8MAT, transposed.
* **S\_EQI** is a case insensitive comparison of two strings for equality.
* **S\_TO\_I4** reads an I4 from a string.
* **S\_TO\_R8** reads an R8 from a string.
* **TIMESTAMP** prints the current YMDHMS date as a time stamp.

You can go up one level to [the FORTRAN90 source codes](https://people.sc.fsu.edu/~jburkardt/f_src/f_src.html).

# *Last revised on 16 October 2014.*

# GMSH\_IO  读写GMSH Mesh文件

**GMSH\_IO** 是一个FORTRAN90库，可以读取和写入GMSH网格划分程序使用的文件。

### 许可：

此网页上提供的计算机代码和数据文件是在[GNU LGPL许可](https://people.sc.fsu.edu/~jburkardt/txt/gnu_lgpl.txt)下分发 [的。](https://people.sc.fsu.edu/~jburkardt/txt/gnu_lgpl.txt)

### 语言：

**GMSH\_IO**是提供 [一个C版本](https://people.sc.fsu.edu/~jburkardt/c_src/gmsh_io/gmsh_io.html)和 [一个C ++版本](https://people.sc.fsu.edu/~jburkardt/cpp_src/gmsh_io/gmsh_io.html)和 [一个FORTRAN77版本](https://people.sc.fsu.edu/~jburkardt/f77_src/gmsh_io/gmsh_io.html)和 [一个FORTRAN90版本](https://people.sc.fsu.edu/~jburkardt/f_src/gmsh_io/gmsh_io.html)和 [一个MATLAB版本](https://people.sc.fsu.edu/~jburkardt/m_src/gmsh_io/gmsh_io.html)。

### 相关数据和程序：

[DOLFIN-CONVERT](https://people.sc.fsu.edu/~jburkardt/py_src/dolfin-convert/dolfin-convert.html)，一个Python程序，可以将网格文件从Gmsh，MEDIT，METIS或SCOTCH格式转换为适合由DOLFIN或FENICS使用的XML格式，由Anders Logg提供。

[FEM\_TO\_GMSH](https://people.sc.fsu.edu/~jburkardt/f_src/fem_to_gmsh/fem_to_gmsh.html)，FORTRAN90程序，读取定义1D，2D或3D网格的FEM文件，即节点坐标文件和节点索引定义的元素文件，并创建Gmsh网格文件。

[GMSH](https://people.sc.fsu.edu/~jburkardt/examples/gmsh/gmsh.html)，说明使用Gmsh程序的示例，1D，2D或3D网格生成器，可以创建适合有限元方法（FEM）使用的网格。

[GMSH\_TO\_FEM](https://people.sc.fsu.edu/~jburkardt/f_src/gmsh_to_fem/gmsh_to_fem.html)，FORTRAN90程序，读取由GMSH程序创建的网格数据文件，并写入一对与FEM格式对应的节点和元素文件。

[MSH](https://people.sc.fsu.edu/~jburkardt/data/msh/msh.html)，MSH文件示例的数据目录，Gmsh使用的原生3D网格格式。

[TETHEX](https://people.sc.fsu.edu/~jburkardt/examples/tethex/tethex.html)，用于说明TETHEX的使用示例，TETHEX是一个C ++程序，可以读取定义三角形或四面体网格的Gmsh文件，并将网格细分为四边形或六面体，适用于DEALII有限元程序，由Mikhail使用Artemiev。

### 参考：

1. Christophe Geuzaine，Jean-Francois Remacle，  
   Gmsh：一种三维有限元网格生成器，内置预处理和后处理设施，  
   国际工程数值方法期刊，  
   第79卷，第11期，第1309-1331页，2009年。

### 源代码：

* [gmsh\_io.f90](https://people.sc.fsu.edu/~jburkardt/f_src/gmsh_io/gmsh_io.f90)，源代码。

### 示例和测试：

* [gmsh\_io\_prb.f90](https://people.sc.fsu.edu/~jburkardt/f_src/gmsh_io/gmsh_io_prb.f90)，一个示例调用程序。
* [gmsh\_io\_prb\_output.txt](https://people.sc.fsu.edu/~jburkardt/f_src/gmsh_io/gmsh_io_prb_output.txt)，输出文件。

### 例程列表：

* **CH\_CAP**将单个字符大写。
* **CH\_EQI**是对两个字符进行不区分大小写的比较。
* **CH\_TO\_DIGIT**返回基数为10的整数值。
* **GET\_UNIT**返回一个免费的FORTRAN单元号。
* **GMSH\_DATA\_READ**从GMSH文件中读取大小。
* **GMSH\_SIZE\_READ**从GMSH文件中读取大小。
* **GMSH\_MESH1D\_WRITE**将1D网格数据写为Gmsh文件。
* **GMSH\_MESH2D\_ELEMENT\_DATA\_EXAMPLE**返回2D示例的元素数据。
* **GMSH\_MESH2D\_ELEMENT\_SIZE\_EXAMPLE**返回2D示例的元素大小。
* **GMSH\_MESH2D\_NODE\_DATA\_EXAMPLE**返回2D示例的节点数据。
* **GMSH\_MESH2D\_NODE\_SIZE\_EXAMPLE**返回2D示例的节点大小。
* **GMSH\_MESH2D\_WRITE**将2D网格数据写为Gmsh文件。
* **GMSH\_MESH3D\_WRITE**将3D网格数据写为Gmsh文件。
* **I4MAT\_COPY**复制I4MAT。
* **I4MAT\_TRANSPOSE\_PRINT**打印I4MAT，转置。
* **I4MAT\_TRANSPOSE\_PRINT\_SOME**打印一些**I4MAT**的转置。
* **R8MAT\_COPY**复制R8MAT。
* **R8MAT\_TRANSPOSE\_PRINT**打印一个转置的R8MAT。
* **R8MAT\_TRANSPOSE\_PRINT\_SOME**打印一些转置的R8MAT。
* **S\_EQI**是两个字符串的不区分大小写，用于求相等。
* **S\_TO\_I4**从字符串中读取I4。
* **S\_TO\_R8**从字符串中读取R8。
* **TIMESTAMP**将当前YMDHMS日期打印为时间戳。

您可以上一级到[FORTRAN90源代码](https://people.sc.fsu.edu/~jburkardt/f_src/f_src.html)。

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