**Boundary Element Method Open Source Software in Matlab/ Octave/Freemat/Scilab**

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| File / Module(s) | [gls\_real\_t.m](http://www.boundary-element-method.com/mfiles/gls_real_t.m), [gls\_complex\_t.m](http://www.boundary-element-method.com/mfiles/gls_complex_t.m) / gls\_real\_t gls\_complex\_t |
| Title | A set of test problems for testing the subroutines [gls](http://www.boundary-element-method.com/mfiles/gls.m) and [regls](http://www.boundary-element-method.com/mfiles/regls.m). |
| Version(Date) and History | **1.** (July 2015).  |
| Description | A set of test problems for testing the subroutines [gls](http://www.boundary-element-method.com/mfiles/gls.m) and [regls](http://www.boundary-element-method.com/mfiles/regls.m) that carry out the solution of a general linear system of equations that arise in the direct boundary element method. Gls/regls solve a general linear system of equations

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|  | $$A\overline{x}=B\overline{y}+\overline{c},$$ | (1a) |

where *A* and *B* are known $n×n $matricesand$\overline{c} $is a known $n$-vector with

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|  | $$α\_{i} x\_{i}+ β\_{i }y\_{i}= f\_{i} for i=1…n$$ | (1b) |
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where the $α\_{i}, β\_{i}$ and $f\_{i}$ are constants with $α\_{i} and β\_{i}$ are never both zero for each *i*. The evaluation of vectors $\overline{x}$ and $\overline{y}$ is the solution of the process. All components are real-valued.The evaluation of vectors $\overline{x}$ and $\overline{y}$ is the solution of the process. regls find a ‘new’ and fast solution with a different *c* and *f* , using information from gls.The test problems used can be found from the following links: [Test Problems for the gls Algorithm with Real Components](http://www.boundary-element-method.com/tests/Test%20Problems%20for%20the%20gls%20Algorithm%20with%20Real%20Components.pdf) : [Test Problems for the gls Algorithm with Complex Components](http://www.boundary-element-method.com/tests/Test%20Problems%20for%20the%20gls%20Algorithm%20with%20Complex%20Components.pdf) |
| Interface | function gls\_t()  |
| Web source of code. | <http://www.boundary-element-method.com/mfiles/gls_real_t.m><http://www.boundary-element-method.com/mfiles/gls_complex_t.m> |
| Web source of this guide | [www.boundary-element-method.com/mfiles /gls\_t\_m.pdf](http://www.boundary-element-method.com/mfiles%20/gls_t_m.pdf) |
| Web source of the algorithm | [www.boundary-element-method.com/tutorials/Numerical Solution of a General Linear System of Equations.pdf](http://www.boundary-element-method.com/tutorials/Numerical%20Solution%20of%20a%20General%20Linear%20System%20of%20Equations.pdf) |
| Dependent routines | LUfbsub : [www.numerical-methods.com/mfiles/LUfbsub.m](http://www.numerical-methods.com/mfiles/LUfbsub.m) |
| Test problems or modules tested | gls : [www.boundary-element-method.com/mfiles/gls.m](http://www.boundary-element-method.com/mfiles/gls.m) regls : [www.boundary-element-method.com/mfiles/regls.m](http://www.boundary-element-method.com/mfiles/regls.m)  |
| Licence | This is ‘open source’; the software may be used and applied within other systems as long as its provenance is appropriately acknowledged. See the [GNU Licence](http://www.gnu.org/licenses/lgpl.txt) for more information or contact webmaster@boundary-element-method.com . |
| Codes that may be used alongside this one |  |
| Similar codes that may be of interest | A similar Fortran code is available on[www.boundary-element-method.com/fortran/GLS2.FOR](http://www.boundary-element-method.com/fortran/GLS2.FOR)and a similar code in Excel-VBA is available on[www.boundary-element-method.com/Excel\_VBA/GLS.xlsm](file:///C%3A%5CUsers%5CStephen%5CDesktop%5CBEM%2010th%20October%202014%5Cfortran%5Cwww.boundary-element-method.com%5CExcel_VBA%5CGLS.xlsm) |
| Applications | LIBEM2, LIBEM3,LIBEMA, LEBEM3, LIBEM3, LSEM3 |
| Author | [Stephen Kirkup](https://www.researchgate.net/profile/Stephen_Kirkup) |
| References | 1. [Numerical Solution of General Linear Systems of Equations](http://www.boundary-element-method.com/guides/Numerical%20Solution%20of%20a%20General%20Linear%20System%20of%20Equations.pdf)2. [www.boundary-element-method.com](http://www.boundary-element-method.com)3. [www.freemat.info](http://www.freemat.info)4. [Matrix Arithmetic](http://www.mathematics.me.uk/tutorials/Matrix%20Arithmetic.htm)5. [Test Problems for the gls Algorithm with Complex Components](http://www.boundary-element-method.com/tests/Test%20Problems%20for%20the%20gls%20Algorithm%20with%20Complex%20Components.pdf) |