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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name | First (and Last) Release/latest web update | Language | Hardware | Related publication/link to software | Methods | Field | GUI/HPC | Coupling | Open Access? | Community | Docs | Level of expertise | Link to repo/src | Comments |
| SimLab | 1985 (2008) | Matlab |  | (JRC, 2015) | Screening, regression-, correlation, and variance-based SA |  | Nil | Loose | Freely available for academic use, open source.  End user free licence. | Nil | Manual and examples |  |  | Development and simulation tool for UA/SA |
| GUI-HDMR | 2008  (2008) | Matlab |  | (Ziehn and Tomlin, 2009) | Variance-based SA and optimization.  Users supply sample, complementary RS-HDMR package exists. |  | Choice of GUI or script-based interface. |  | Freely available for academic use, but not open source. | Nil | Manual |  |  | Appears to be abandoned |
| Dakota | Pre-2009  (2018) | C, C++, Fortran77, Fortran90 | Linux, Unix, Windows | (Adams et al., 2010)/http://Dakota.sandia.gov/index.html | Optimization, parameter estimation, local and global SA, MC, stratified sampling, and approximate UA |  | Parallelization and GUI options | Close, semi, or loose | Freely available for academic use, open source with various levels of user interaction. LGPL from version 5.0. | User mailing list and user-developer interaction. | Manual and examples |  | <https://dakota.sandia.gov/content/getting-dakota-source-code> | Toolkit for optimization, experimental design, and UA/SA |
| PSUADE | 2014  (2018) | C++ |  | (Gan et al., 2014) | 14 sampling methods and 12 SA methods (local/global) | Developed for large complex systems models, applied to various fields | Nil | Loose | Free public licence, open source. LGPL. | User community | Manual. |  | <https://github.com/LLNL/psuade> |  |
| UQ Lab | 2014?  (2018) | Matlab, R linkage | All | (Marelli and Sudret, 2014) | Sampling and global SA (linkage to R Sensitivity package) |  | Parallelization. | Loose | Freely available for academic use. Content management system is licensed, scientific modules are open source. | User collaboration encouraged, users can contribute to code with revision by developers | Manuals, examples, release notes. | Beginner to advanced functionality |  |  |
| SAFE | 2015  (2015) | Matlab, Octave, R | All | (Pianosi et al., 2015) | Sampling, local and global SA |  | GUI options |  | Freely available for academic use, open source. | No user community, easily adapted to personal use | Pianosi et al, workflow scripts | Beginner to advanced functionality |  | Designed for users with limited global SA/Matlab experience |
| R - Sensitivity package | 2018?  (2018) | R | All | (Iooss et al., 2018) | SA |  | Nil | Close or loose | Free public licence (GPL-2), open source. | Developer community. | Manual | Assumes knowledge of R | <https://www.rdocumentation.org/packages/sensitivity/versions/1.15.2/source> |  |
| VARS-TOOL | 2016?  (2018) | Matlab, C++, OSTRICH | All | (Razavi et al., 2019) | Sampling and global SA |  | Parallelization and visualization | Loose | Free for non-commercial use, open source. | Nil | Manual | Beginner to advanced functionality | <http://vars-tool.com> |  |
| SALib | 2013  (2018) | Python |  | (Herman and Usher, 2017) | Sampling, global SA, and bootstrap confidence intervals |  | Visualization |  | Free public licence (MIT), open source. | User community | Manual, examples, release notes |  | <https://github.com/SALib/SALib> |  |
| MADS | 2016  (2018) | Julia |  | ? | Sampling, optimization, SA |  | HPC and parallelization |  | Free public licence (GPL), open source. | User community | Manual and examples |  | <https://github.com/madsjulia/Mads.jl> | Underlying language (Julia) is relatively young |
| GLUE | 1992 (2013) | R, Matlab/Octave |  | <https://doi.org/10.1002/hyp.3360060305> | Screening, importance sampling, and parameter estimation |  |  |  |  |  | Manual and examples |  |  | Method implemented in software developed by creators (R) and users (Matlab) |
| PEST | /2019 | C, C++, FORTRAN, Python | Unix, Windows | (Doherty, 2004) | Calibration, optimization, MC, importance sampling, approximate UA, local SA. |  | Parallelization |  |  | User-developer interaction, training courses | Manual, examples |  |  |  |
| SWAT | 2000 (2018) |  |  |  | Catchment simulation model |  |  |  | Free public licence, open source | User community, user-developer interaction, workshops/conferences | Manual |  |  | Externally developed tools/interfaces developed to implement e.g. SA, GUI |
| DUET-H/WQ | 2008 |  | Windows | (Harmela et al, 2008) |  | Hydrology, water quality | Nil |  |  |  |  |  |  | Software appears to be abandoned |
| DUE | 2006 | Java |  | 10.1016/j.cageo.2006.06.015 | Population, geospatial, and time series data analysis |  |  |  | GPL, open source |  | Manual and examples |  |  | Link to src in publication has expired |
| TOPMODEL |  |  |  | (Beven et al, 1995) | Rainfall-runoff model, topographic | Hydrology |  |  |  |  |  |  |  |  |
| hydroPSO |  | R |  | <https://cranproject.org/web/package/hydroPSO/index.html> | Optimization |  |  |  | GPL, open source | User community |  |  |  | Particle swarm optimization |
| WaterRAT | 2004 | Microsoft Excel |  |  | Simulation models, UA/SA, data collection | Hydrology |  |  |  |  |  |  |  | Surface water quality assessment tool |
| GANetXL | 2006 | Microsoft Excel |  | <http://dx.doi.org/10.1016/j.envsoft.2010.11.004> /  <http://www.exeter.ac.uk/cws/ganetxl> | Optimization | General purpose | GUI |  | Free for non-commercial use | User community | Manual, examples |  |  | Decision support system generator |
| MODFLOW | 1984 (2018) |  | Windows | https://water.usgs.gov/ogw/modflow/MODFLOW.html |  | Hydrology |  |  | Open source | User-developer interaction | Manual |  |  |  |
| UTCHEM | 1989 (1996) | FORTRAN |  | <https://www.osti.gov/servlets/purl/281959> |  | Hydrology | Parallelization |  |  |  |  |  |  | Chemical flooding simulator  Appears to be abandoned |
| mDSS | 2004 (2010) |  | Windows | http://www.netsymod.eu/mdss/ | Socio-economic and environmental models, GIS, multi-criteria decision aids | Water resource management |  |  |  |  | Manual and examples |  |  | Decision support system for EU Water Framework Directive |
| ArcNLET | 2011 (2013) |  |  | https://people.sc.fsu.edu/~mye/ArcNLET/ | GIS-based screening, simulation model | Hydrology |  |  | Free for commercialand non-commercial use |  | Manuals and sample data |  |  | Groundwater nitrate fate and transport model |
| PERSiST | 2013 |  |  | [www.hydrol-earth-syst-sci.net/18/855/2014/](http://www.hydrol-earth-syst-sci.net/18/855/2014/) | Simulator, MCMC SA | Hydrology |  |  |  |  |  |  |  | Solute transport simulation, for use with INCA models |
| Day Cent | 1994 (2013) |  |  | <https://www2.nrel.colostate.edu/projects/daycent-downloads.html> | Carbon and nitrogen flux simulation, sub-modules | Biogeochemical |  |  | Free by request |  | Manual |  |  | Daily time-step version of CENTURY model |
| Eco-RoM |  |  |  |  | Risk assessment, management, cost optimization |  |  |  |  |  |  |  |  |  |
| ChemKIN-PRO | 1980s (2018) |  |  | https://www.ansys.com/products/fluids/ansys-chemkin-pro | Gas-phase and surface chemistry model | Industrial modelling | GUI, parallelization |  | Not free |  |  |  |  |  |
| TAMkin | 2013 (2017) | Python |  | http://dx.doi.org/10.1021/ci100099g |  | Chemistry |  |  | Free, open source, GNU |  |  |  | http://molmod.github.io/tamkin/ | Post-processing toolkit for normal mode analysis, thermochemistry, and reaction kinetics |
| JUPITER API | 2006 (2013) | FORTRAN-90 |  | http://water.usgs.gov/software/JupiterApi | Local SA and parameter estimation |  | Parallelization | Close or loose | Free and open source | User-developer interaction | Manual, examples |  |  | To improve model analysis software development |
| OSTRICH | (2017) |  |  | (Matott, 2017)/ http://www.eng.buffalo.edu/~lsmatott/Ostrich/OstrichMain.html | Calibration, optimization, parameter correlation, UA, local SA, GLUE, quantitative multimodal analysis |  | Parallelization |  | Free and open source | User community for hydrologists | Manual, examples |  |  |  |
| PEAS | 2005 | Matlab |  |  | Model assessment, local (trajectory) SA, parameter estimation, confidence intervals, MC |  | GUI |  | Free for academic use by request |  |  |  |  |  |
| UCODE | 2005 (2015) | perl |  | <https://doi.org/10.1016/S0098-3004(98)00149-6> | Calibration, global parameter estimation, approximate UA, local SA inverse modelling |  |  |  | Free and open source |  | Manual |  | https://igwmc.mines.edu/ucode/ | Software abandoned but download still available |
| UNCSIM | 2006 | Text file interface |  | (Reichert, 2006) | Local SA, MC, stratified, and importance sampling, parameter estimation |  |  |  | Free |  |  |  |  | Interface between systems analysis software and simulators |
| MCAT | 2001 (2014) | Matlab |  |  | Screening and correlation-based SA, temporal and behavioral identification analysis, UA, GLUE, PARETO |  | GUI |  | Free and open source | Unofficial GitHub page | Manual and examples |  |  |  |
| MOGSA | 1998 |  |  | (Bastidas, et al, 1999) | Correlation-based SA |  |  |  | Freely available by request, open source |  |  |  |  | Algorithm |
| RIMME | 2003 |  |  | 10.1080/1389517049051541 | Correlation-based and regionalization SA, importance sampling |  |  |  | Free, open source |  |  |  |  | Integrates quantitative uncertainty and qualitative (e.g. stakeholder) uncertainty into model analysis |
| SARS-RT |  |  |  | http://www.tonyohagan.co.uk/academic/GEM/ | Correlation- and regression-based SA |  |  |  | Software unavailable |  | Method description |  |  | Method |
| GEM | 2005 (2009) |  |  |  | Variance-based SA, MC and MCMC sampling, Gaussian emulation |  |  |  | Free for non-commercial use |  | Manual and examples |  |  |  |
| Crystall Ball |  | Microsoft Excel |  |  | Predictive modelling, forecasting, simulation, optimization |  |  |  | Not free |  |  |  |  |  |