



Linking the use of a dummy parameter to the optimization of the convergence of the Sobol' sensitivity analysis

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The variance-based Sobol' method is known to be a very powerful and straightforward sensitivity analysis technique that has gained popularity in environmental modelling over the past decade. Nevertheless, the high number of model evaluations necessary to perform the sensitivity analysis is a major restriction for the method's use and, as a consequence, improving its convergence is of the utmost importance. Therefore, we will present an optimized calculation approach for the Sobol' sensitivity indices that is linked to the application of appropriate equations for the estimation of the square of the expectation value and the total variance, and the use of a dummy parameter. The technique of the dummy parameter was first introduced by Zadeh et al. (2017) and is based on the introduction of a model independent parameter that has no influence on the model output. It will be shown that the computation of the Sobol' sensitivity index of this dummy parameter can be directly linked with an optimized convergence of this SA method.

Zadeh, F.K., Nossent, J., Sarrazin, F., Pianosi, F., van Griensven, A., Wagener, T. and Bauwens, W. (2017) Comparison of variance-based and moment-independent global sensitivity analysis approaches by application to the SWAT model. *Environmental Modelling & Software*, 91, 210-220. doi: 10.1016/j.envsoft.2017.02.001