PEST course

Date: 9 September – 13 September 2019
Location: University of Neuchâtel

Speaker : John Doherty, the author of PEST and the Darcy lecturer for 2019

The program is as follows:

Day 1, morning:
- welcome
- models and decision support - what models can and cannot achieve
- revision of basic linear algebra and statistics

Day 1, afternoon:
- parameter estimation for well-posed inverse problems – theory and practice
- introduction to the PEST suite
- introduction to the PEST++ suite
- basic workshop on PEST

Day 2, morning:
- highly parameterized inversion
- manual, subspace and Tikhonov regularisation
- the cost of uniqueness

Day 2, afternoon:
- parameter estimation in groundwater modelling
- pilot points as a parameterization device
- SVD-assisted inversion
- workshop on calibrating a highly-parameterized model

Day 3, morning:
- more on groundwater model calibration
- the need for creativity in formulating an objective function
- one-sided penalty functions
- surface water model calibration

Day 3, afternoon:
- highly parameterized inversion in surface water and land-use modelling
- regionalization of surface water and land use parameters
- global optimizers available through the PEST and PEST++ suites – CMAES, SCE, DE, PSO
- continuation of workshop on highly parameterized inversion

4 p.m. : Darcy lecture

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Day 4, morning:

- introduction to uncertainty analysis
- Monte Carlo methods
- linear uncertainty analysis
- assessment of data worth
- Bayes equation and enforcement of calibration constraints

Day 4, afternoon:

- geostatistical methods
- enforcing calibration constraints where there are many parameters
- quasi linear methods
- Null space Monte Carlo
- ensemble methods
- workshop on linear and nonlinear uncertainty analysis

Day 5, morning:

- calibration of defective models, theory and practice
- direct predictive hypothesis testing
- decision outcome optimization
- optimisation under uncertainty

Day 5, afternoon:

- course participants discuss their own examples
- farewells

If you are interested and want to sign up please visit:

https://www.unine.ch/phdschool-wes/home/programme.html

If you have any question about the program or the organization of the course, please do not hesitate to contact us.

The course is free for PhD students members of the PhD school Water-Earth systems.

Thanks also for letting this information circulate among your colleagues and students who could be interested.

Contact: school.earth-water@unine.ch