PEST Workshop Agenda
Model-Independent Parameter Estimation & Uncertainty Analysis

Tuesday, September 16, 2014

Time	Section	Lecture Components	End
8:30 AM	Introductions and Logistics	*n/a*	8:45 AM
8:45 AM	Introduction to non-linear parameter estimation	*Least squares*	
		Mathematical theory of linear and non-linear parameter estimation	
		Integrating the non-linear theory with one or more forward model(s)	10:30 AM
10:30 AM	*Break*	*n/a*	11:00 AM
11:00 AM	*Hands-on exercise: calibrating a simple model*	*Demonstrates file set-up and major elements*	12:00 PM
12:00 PM	*Lunch Break*		1:00 PM
1:00 PM	The Fundamentals of PEST	*Implementing non-linear parameter estimation theory using PEST*	
		Contents and construction of PEST input files	
		Contents of the PEST output files generated during calibration	2:45 PM
2:45 PM	*Break*	*n/a*	3:15 PM
3:15 PM	Diagnosing regression performance	*Diagnosing regression performance throughout the calibration*	4:30 PM
4:30 PM	*Hands-on exercise: calibrating a simple model*	*Demonstrates calibration and diagnosis*	5:30 PM

Wednesday, September 17, 2014

Time	Section	Lecture Components	End
8:30 AM	Calibration of Groundwater Models of Flow and Transport	*What is possible?*	
		Calibration objectives and design	
		Example applications	9:30 AM
9:30 AM	*Hands-on exercise: calibrating a simple model*	*Demonstrates non-uniqueness, use of prior information*	10:15 AM
10:15 AM	*Break*		10:45 AM
10:45 AM	Alternative model parameterization methods	*Variety of alternative methods for spatial models*	
		Introduction to regularization	11:30 AM
11:30 AM	PEST and CA-DWR Models	*IWFM, DSM2*	12:30 PM
12:30 PM	*Lunch Break*		1:30 PM
1:30 PM	Ill-Posed Problems and Highly Parameterized Inversion	*Expert Knowledge*	
		Metrics for uniqueness	
		Information transfer expresses through singular value decomposition	3:30 PM
3:30 PM	*Break*		4:00 PM
4:00 PM		*Model simplification as a regularization device*	
		PEST's "SVD-assist" methodology	
		The resolution matrix	6:00 PM

Thursday, September 18, 2014

Time	Section	Lecture Components	End
8:30 AM	Uncertainty Analysis	*Advanced sensitivity analysis*	
		Loss of detail incurred through model calibrations	
		Linear propagation of uncertainty and error	10:30 AM
10:30 AM	*Break*		11:00 AM
11:00 AM		*Nonlinear predictive uncertainty and error variance analysis*	
		Calibration-contained stochastic uncertainty analysis	
		Data worth analysis and parameter contribution to uncertainty	12:30 PM
12:30 PM	*Lunch Break*		1:30 PM
1:30 PM	Working with Defective Models: Conclusions	*Causes and identification of defects*	
		Structural noise	
		Surrogate roles of parameters	3:00 PM
3:00 PM	*Break*		3:30 PM
3:30 PM		*Prediction-specific calibration*	
		Model-based decision-making	4:45 PM
4:45 PM	Wrap-up and Closing Comments		5:00 PM