



Faculty of Applied Science  
CHEMICAL ENGINEERING



**“Identifying overparameterised biological wastewater treatment models with prior information regarding a subset of the parameters”**

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**ABSTRACT**

Wastewater treatment (WWT) models have become increasingly complex and have nicely followed the increasing computing power available to researchers and practitioners. Unfortunately the information available to work with these increasingly complex models has not kept up and modeling practice is now suffering from what is commonly known as the identifiability problem. This contribution focuses on how one is currently dealing with this problem in this field, both in practice (e.g. consulting engineers) and in research. The identifiability problem basically boils down to the problem that multiple sets of model parameters can describe the data equally well, leading to the impossibility of producing an unique parameter set that represents reality. Basically this occurs when the information content of the experimental data available to the modeler is insufficient to feed the parameter estimation process. Uncertainties on the parameters therefore become very large (with extremely wide confidence intervals) and parameter correlation is very high. Moreover, it leads to extensive numerical problems (poor convergence and presence of local minima) when nonlinear optimization algorithms are used to find the best parameter values. In the presentation, four approaches to work with the WWT models despite this problem have been identified.