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Susana Gomez* (susanag@servidor.unam.mx), IIMAS-UNAM, Apdo. Postal 20-726, 01000 Mexico, D.F., Mexico, **Nelson Del Castillo** (nelson@leibniz.iimas.unam.mx), IIMAS-UNAM, Apdo. Postal 20-726, 01000 Mexico, D.F., Mexico, **Olivier Gosselin** (Olivier.Gosselin@total.com), 33 Cavendish Square, W1G OPW London, England, and **Tony Fincham**, 33 Cavendish Square, W1G OPW London, England. *Parallel Global Optimisation for Parameter Estimation.*

Parameter Estimation plays an important role in many applications, specially in the case of dynamic simulations. Due to the ill-posedness of this inverse problem, the least-squares optimisation may have many local optimal solutions with good match to the data, which produce alternative scenarios. These alternative solutions also provide a way to deal with the uncertainty of the modelling process. In real cases, the presence of noisy data has to be addressed using regularisation methods to obtain stable solutions.

Our aim is the generation of global optimisation methods that obtain many local optimal solutions with good match to the data in a stable way, and in reasonable computer time, to produce efficient decision making tools.

We will present here the Parallel Tunnelling Global Optimisation Method, and the role of local methods, regularization and scaling will be shown on synthetic and real field cases for oil reservoir characterisation and monitoring.

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