

Paper Number 56696
Title **Managing Uncertainties on Production Predictions Using Integrated Statistical Methods**
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Source SPE Annual Technical Conference and Exhibition, 3-6 October, Houston, Texas

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Abstract

Reservoir engineering requires to manage many sources of uncertainties that can be classified in two categories: (a) uncontrolled uncertainties on the physical reservoir description parameters and (b) controlled uncertainties on the reservoir development scheme parameters. In this context engineers must answer several problems: describe prior uncertainties, identify the ones that actually influence the oil production process, make safe production forecasts and optimize the reservoir production scheme.

In this paper, several statistical methods dealing with these problems are presented. They are (a) Experimental Design, (b) Response Surface Methodology and (c) Monte-Carlo methods. Integrating these techniques enables to build a simplified model of a process and to estimate the uncertainties on the response predictions. The entire procedure was applied to a field case showing both types of controlled and uncontrolled uncertainties. The result is a new frame allowing engineers to quantify uncertainties on the reservoir production forecasts conditionally to uncertainties on the reservoir modeling parameters. The procedure has lower computational costs than the traditional one but is quite complex and needs adapted software to be used by reservoir engineers.