A Strategy for the Application of Second-Order Monte Carlo Algorithms to Petroleum Exploration and Production Projects

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Abstract : Due to the recent volatility in oil & gas prices as well as increased development of non-conventional resources, it has become even more essential to critically evaluate the profitability of petroleum prospects prior to making any investment decisions. Traditionally, simple Monte Carlo (MC) algorithms have been used to randomly sample probability distributions of economic and geological factors (e.g. price, OPEX, CAPEX, reserves, productive life, etc.) in order to obtain probability distributions for profitability metrics such as Net Present Value (NPV). In recent years, second-order MC algorithms have been shown to offer an advantage over simple MC techniques due to the added consideration of uncertainties associated with the probability distributions of the relevant variables. Here, a strategy for the application of the second-order MC technique to a case study is demonstrated to analyze its effectiveness as a tool for portfolio management.

Keywords : Monte Carlo algorithms, portfolio management, profitability, risk analysis
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