

Decline R A Statistical Tool for Production Forecasting

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With the objective to reduce the uncertainty of the models used in the production forecasting process, other methodologies have been explored to allow improvements in the process. One of these methodologies used is the developed in 1970 by Box & Jenkins for the analysis of time series (ARMA and ARIMA models). However, there are some limiting factors such as the high degree of complexity of the models and the loss of robustness of the forecasts in the long term.

To reduce the complexity of the analysis, a statistical analysis automation tool called Decline R was developed, which combines the Box & Jenkins methodology with the Arps curves, improving the prognosis and significantly reducing the complexity and time of the process.

Decline R is a developed tool using software R integrated with visual basic to facilitate de user experience using a friendlier interface allowing the user to select himself the ARMA or ARIMA model for the process or to use the self-selection of the model by the software.

Five (5) wells were analyzed with the most commonly used commercial tools and Decline R. Short-term forecasts were higher than those found with commercial tools. For the values of the one, two and three year forecasts the results were similar in all models. In the process of cross validation for 7 years, the adjustment of the forecast using ARMA or ARIMA models was lower in comparison with the commercial models.

In conclusion, when the wells have marked declination trends in long-term, it is possible to represent them using Arps curves and then to model the other components through the Box & Jenkins methodology, obtaining more accurate forecasts. For short-term forecast, ARMA or ARIMA models are better option.

Biography:

Dr. Carlos Alfonso Mantilla Duarte is an Economist, Specialist in statistics, M.Sc (c) and Ph.D (c) in Applied Statistics. Assistant professor in School of Economics and School of Petroleum Engineering from Universidad Industrial de Santander (Industrial University of Santander) in Bucaramanga, Colombia and Assistant Professor in the area of statistics of the speech-language pathology program from Universidad de Pamplona (University of Pamplona) in Pamplona, Colombia. Researcher in the areas of: time series, spatial statistics and spatio-temporal data, multivariate analysis, panel data, big data, Bayesian statistics, computational statistics, biostatistics and multi-dimensional scaling.