Decline curve analysis spreadsheet

This Excel spreadsheet plots Fetkovich drop curves for gas wells. Decline curve analysis is an empirical procedure that predicts the decline in production rates of gas and oil wells. Fetkovich (1968) improved on previous arps work in predicting declining production of oil and gas wells. He suggested that experimental production speed data could be covered on a graph and matched to a range of type curves. The production rate is then extrapolated in the future using the curves. The Excel spreadsheet reproduces the plot in Figure 8 of the following reference. Fetkovich, M.J., Decline Curve Analysis Using Type Curves, Journal of Petroleum Technology (June 1980) 1065-77. The drop curve rate-time comparisons are given below. where n is a factor that regulates the shape of the counterpressure curve qDd is the drop curve dimensionless production speed tDD is the drop curve dimensionless time Wildcax developed its Decline Curve Analyzer, a web application designed to remove these painful steps from your daily work. The Analyzer performs similar drop curves analysis simultaneously on hundreds of wells, using industry-standard regression models (Arps Hyperbolic, Stretched Exponential...). The analysis is then displayed on a dynamic, user-friendly user interface that lets you customize a number of charts, create model comparison, and selection, to efficiently choose a relapse curve for each product from each well and export the results to your desktop. You will find a few situations below where using Wildcax's Decline Curve Analyzer will save you a lot of time, and will prevent you from making common modeling errors: You need to build your spreadsheet from the beginning. No more building from scratch, we've set everything up for you, just log in and access all your usual drop curve analysis tools. You must import/export one historical dataset at a time. We offer user-friendly CSV upload templates for daily and monthly production values, which allow you to import all your data into one file, in just one copy & paste edit. Our software will identify each good by their name/id and perform an analysis automatically on each of them. You must identify the peak month and the decay portion of your historical dataset. Our algorithm automatically identifies the peak month, or highest historical production flow, in your historical dataset for each well, and only performs a Decline Curve Analysis on the decline section of your wells. You may have noticed that in our example in the spreadsheet buildout, the Estimate column doesn't take into account the peak month identification step. We should perform that step manually for every well in your sample in a real-life situation. You don't have the industry standard regression models (with Excel) available. We the industry standard regression models (Arps Hyperbolic, Stretched Exponential ...) in our Decline Curve Analysis. Our formulas are clearly explained on our website our blog entries) and the output parameters for each model appear on the user interface. You need to manually adjust your relapse curve. Our optimization algorithm will find the best drop curve that fits your historical dataset (provided the dataset can be exploited by the algorithm). Our software can perform multiple drop curve analysis using multiple models on hundreds of wells and display the results in minutes. If you then want to compare our models best fit, you can show up to two models at once for each chart and select the most accurate drop curve for your regression. You have to build every extra feature you want. We optimize the plots, we offer a linear and logarithmic display mode, and more importantly, we've built powerful features to help you refine your analysis: for example, you're showing or hiding a cumulative production curve from each historical dataset and decay curves displayed on your plots. In addition, the peak production flow rate, remaining production, and optimized parameters of the model are displayed below each chart to help you with your analysis. You need to collect and aggregate your output. With our Analyzer tool, our Analyzer tool allows you to export your selected rollback curve and associated historical production data for hundreds of wells in just two clicks. All you have to do is name your export file and you'll find it on your desktop in seconds. Our CSV export files are easy to use for further data manipulation, they show the historical oil and gas production for each of your wells, complemented by the drop curve you have selected for each well and product. An extract from Wildcax's drop curve using the Arps Hyperbolic Model, applied to the well-used sample used in the spreadsheet build-out, is shown below: Would you all be interested in an excel template for decline curve analysis? I've had a few comments/posts on this lately and curious to see how many of you out there would benefit from having a template. I'm a petroleum engineer grad currently out of a job, and if this gets traction I could whip something up. I would appreciate any type of donation if possible in these difficult times! If there is anything like that you are all in need, please let me know here I would like to help if possible. Edit: Thanks for the positive feedback everyone. DM me if you want me to send you a template! I'll start working on this and hopefully catch what the majority of you are looking for! Page 2 31 comments Fall curve analysis of oil and gas wells has evolved over time as we have learned how a reservoir behaves. Although decline curve interpretations have changed, the fundamentals are the same. Here I drop curve analysis to introduce through rate-time forecasting. An example of a rate-time drop curve is shown below: Decline curve analysis through rate-time forecasting has disadvantages, for example, it often overestimates reserves, ignores flow regime changes and is affected by shut-ins. However, however de principes van hoe een rate-time voorspelling uit te voeren is een bouwsteen voor de daling van vandaag curve interpretaties. In deze les zal ik laten zien hoe de productie gegevens voorspellen met behulp van de rate-time daling curve interpretatie om de reserves en de EUR van een gasput in excel te bepalen. Ik zal laten zien hoe de Arp daling curve vergelijkingen programma in Excel VBA voor elke situatie ondervonden voor rate-time daling (harmonische, exponentiële, en hyperbolische daling). Bekijk de video voor meer informatie. The Data used in this example and the code is shown below: '// 'This function calculates the instantaneous flow rate of a hyperbolic decline or exponential decline curve at a particular time t Function ArpsRate(qi, Di, b, t) 'qi: initial rate (constant) 'Di: initial decline rate (constant) 'b: b value (constant) 't: time at which you want to calculate the rate (variable) 'if b=0, then it will call the exponential rate method If b = 0 Then 'calls the exponential rate method ArpsRate = exponentialRate(qi, Di, t) Else 'else it calculates the hyperbolic rate using the hyperbolic equation ArpsRate = qi / (1 + b * Di * t) ^ (1 / b) End If End Function '// 'This function calculates the instantanous flow rate of an exponential decline curve Function exponentialRate(qi , Di, t) 'qi: initial rate 'Di: initial decline rate 't: time at which you want to calculate the rate exponentialRate = qi * Exp(-Di * t) End Function '// 'This function calculates the cumulative rate from an initial rate and final rate Function cumulativeProduction(qi, Di, b, q) If b = 1 Then cumulativeProduction = qi / Di * Log(qi / q) Else 'cum as a function of rate cumulativeProduction = qi ^ b / (Di * (1 - b)) * (qi ^ (1 - b) - q ^ (1 - b)) End If End Function '// 'This function calculates the instantaneous decline rate of Arps decline equation at a specified time for a given fit Function NominalDecline(Di, b, t) 'Di: initial decline rate 'b: decline exponent 't: time in which you want to calculate the decline rate 'Nominal decline is the instantaneous decline rate NominalDecline = Di / (1 + b * Di * t) End Function GasProductionData_RateTime.txtDownload GasProductionData_RateTime.txtDownload