

Mathematics; Investigators from University of Texas Austin Have Reported New Data on Mathematics (A New Approach To Apply Decline- Curve Analysis for Tight- Oil Reservoirs Producing Under Variable Pressure Conditions)

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Mathematics is the subject of a report. According to news originating from Austin, Texas, by VerticalNews correspondents, research stated, "Decline-curve models inherently assume that the bottomhole flowing pressure (BHP) is constant. This is a poor assumption for many unconventional wells."

Financial support for this research came from State of Texas Advanced Resource Recovery Program (STARR) at the Bureau of Economic Geology.

Our news journalists obtained a quote from the research from the University of Texas Austin, "For this reason, the application of decline-curve models might lead to incorrect flow regime identification and estimated ultimate recovery (EUR). This work presents a novel technique that combines variable BHP conditions with decline-curve models and compares its results with traditional decline-curve analysis (DCA) for both synthetic and tight-oil wells.

Using superposition, we generate a synthetic rate example using the constant-pressure solution of the diffusivity equation for a slightly compressible fluid (decline-curve model) along with a BHP history. However, we validate the technique using bottomhole and initial reservoir pressures that contain errors. The algorithm consists of three sequential optimizations. In each optimization, the algorithm estimates (1) the decline-curve model parameters, (2) the BHP, and (3) the initial reservoir pressure."

According to the news editors, the research concluded: "The result of the synthetic example leads to an accurate production history match and corrected estimates of the initial reservoir pressure and the BHP history."

This research has been peer-reviewed.

For more information on this research see: A New Approach To Apply Decline- Curve Analysis for Tight- Oil Reservoirs Producing Under Variable Pressure Conditions. SPE Journal, 2024;29(3):1655-1671. SPE Journal can be contacted at: Soc Petroleum Eng, 222 Palisades Creek Dr, Richardson, TX 75080, USA.

The news correspondents report that additional information may be obtained from Leopoldo Matias Ruiz Maraggi, University of Texas Austin, Bur Econ Geol, Austin, TX 78712, United States. Additional authors for this research include Mark P. Walsh and Larry W. Lake.