Project Objectives

• To create a multi-Segmented decline curve analytical tool to drive production forecasting in unconventional plays
• Develop a structured workflow for type well construction in GSA rigorously rooted in relevant fluid flow principles
• Develop a computational tool for evaluating E&P projects based on rescaled production profiles

Methodology

Developing our workflow

3—segment Arp’s Hyperbolic equations used for history matching (5 parameter model)

\[ q(t) = \begin{cases} q_{flow} \left(1 + b_{trans} \cdot t \right) \cdot \frac{1}{b_{trans}} & t < t_{sw1} \\ q_{trans} \left(1 + b_{trans} \cdot \frac{t}{t_{sw1}} - \frac{t}{t_{sw1}} \right) & t_{sw1} \leq t < t_{sw2} \\ q_{adj} \left(1 + b_{adj} \cdot \frac{t}{t_{sw2}} - \frac{t}{t_{sw2}} \right) & t \geq t_{sw2} \end{cases} \]

• Tightness factor introduced for estimation of switch times
• Model calibrated with by theoretical end of linear life concept (Lee et al., 2004)
• Varied permeability, fracture spacing and half-length in simulations
• Monte-Carlo simulations on key model parameters

Results

• RTA Analytical simulations
• Finite difference numerical simulations
• Real field data (production forecasting)

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