

Watercut WW History Matching @model

Watercut WW History Matching @model predicts production adjustments coefficients $\alpha_W(t)$, $\alpha_O(t)$ from WW plot by minimizing the following goal function:

(1)

$$E[\alpha_W(t), \alpha_O(t)] = \sum_t \min D(P_{\text{mod}}(t), P_{\text{hist}}(t)) \rightarrow 0$$

where D is the distance between each historical point and model curve on WW plot:

(2)

$$D(P_{\text{mod}}(t), P_{\text{hist}}(t)) = \sqrt{(WOR_{\text{mod}} - WOR_{\text{hist}})^2 + (\Sigma WOR_{\text{mod}} - \Sigma WOR_{\text{hist}})^2}$$

where

(3)

$$WOR_{\text{hist}} = \frac{\alpha_W(t) \cdot q_W^\uparrow}{\alpha_O(t) \cdot q_O^\uparrow}$$

(4)

$$\Sigma WOR_{\text{hist}} = \frac{\int_0^t \alpha_W(t) \cdot q_W^\uparrow dt}{\int_0^t \alpha_O(t) \cdot q_O^\uparrow dt}$$

and $\min D(P_{\text{mod}}, P_{\text{hist}})$ means minimal distance between point $P_{\text{hist}} = (\Sigma WOR_{\text{hist}}, WOR_{\text{hist}})$ and the model curve $P_{\text{mod}} = (\Sigma WOR_{\text{mod}}, WOR_{\text{mod}})$.

The results of the history matching are illustrated on **Fig. 1** below.

Fig. 1.1 – WW plot before history matching	Fig. 1.2 – WW plot after history matching
Fig. 1.2 – The production adjustments coefficients from Watercut WW History Matching @model	

See Also

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