

بهینه سازی تولید میادین نفتی با استفاده از الگوریتم ژنتیکی

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مقدمه

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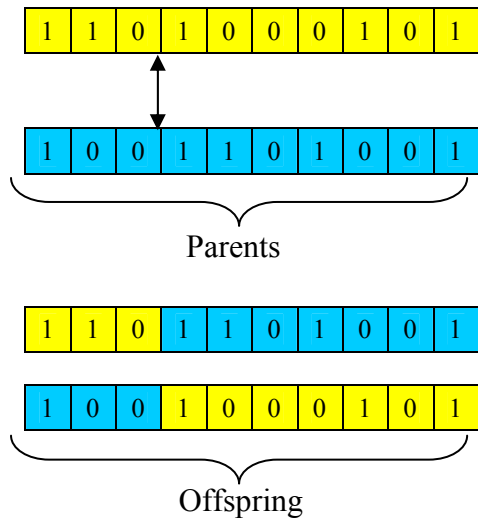
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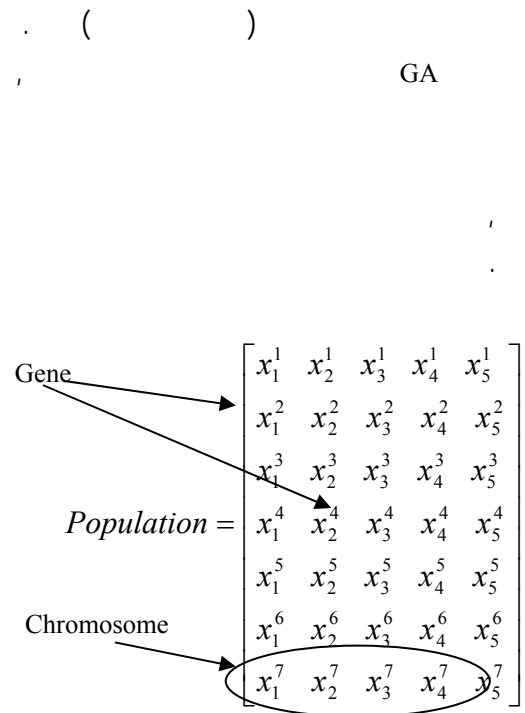
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Polytope	[] Palke et al. (1998)	[] Aronofsky and Lee (1958) .
	Gas Lift	Aronofsky and Williams .
Yan Pan et al. (1999) .	[]	[] (1962)
(Least Squares)	[]	[] Attra et al. (1961) .
	الگوریتم ژنتیکی (GA)	
	GA	
		[] O'Dell et al. (1973)
		[] Huppler (1979) .
		[] Wattenbarger (1970)
		[] Rosenwald and Green (1974)
		[] Murray and Edgar (1978)
		[] Zakirov and Kolbikov (1982) (Material Balance)
GA		[] Lea and Brown (1986) Nodal Analysis
		Fujii and Horne (1995) .
		(GA) Polytope []
		Carroll and Horne .
	GA	Finite Polytope [] (1992) Difference
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شکل ۲: عمل لقاح در سیستم دودویی.

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شکل ۱: جمعیت و اجزای تشکیل دهنده آن در سیستم حقیقی.

$$\mathbf{v}'_1 = \mathbf{v}_1 + (1 - \lambda) \mathbf{v}_2$$

$$\mathbf{v}'_2 = \mathbf{v}_2 + (1 - \lambda) \mathbf{v}_1$$

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$$\lambda \begin{pmatrix} \mathbf{v}_2 & \mathbf{v}_1 \\ \mathbf{v}'_2 & \mathbf{v}'_1 \end{pmatrix}$$

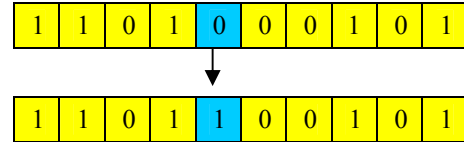
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شکل ۳: عمل جهش در سیستم دودویی.

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$$x'_k = x_k + \Delta(t, x_k^U - x_k) \quad (1)$$

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$$x'_k = x_k - \Delta(t, x_k - x_k^L) \quad (2)$$

جریان عمودی سیال (مدل لوله مغزی)

$$t \left(\begin{matrix} x_k^L & x_k^U \\ x_k \end{matrix} \right) \Delta(t, y)$$

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$$\Delta(t, y) = y.r.\left(1 - \frac{t}{T}\right) \quad (3)$$

Aziz, Govier, and Fogarasi (AGF)

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:(Sorting)

ساخت مدل

(AGF)

$$N_x = V_{SG} \left(\frac{\rho_G}{0.0764} \right)^{1/3} \left(\frac{72 \rho_L}{62.4 \sigma_L} \right)^{1/4} \quad (4)$$

$$N_y = V_{SL} \left(\frac{72 \rho_L}{62.4 \sigma_L} \right)^{1/4} \quad (5)$$

$$N_y \quad N_x$$

$$AGF$$

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AGF

AGF

Sachdeva, Schmidt, Brill,

[] and Blais

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مدل تفکیک کننده^{۵۰}

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مدل کاهنده^{۴۶}

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$N_{wh}(1 - L_1) + N_{wh}L_1(1 - L_2)$

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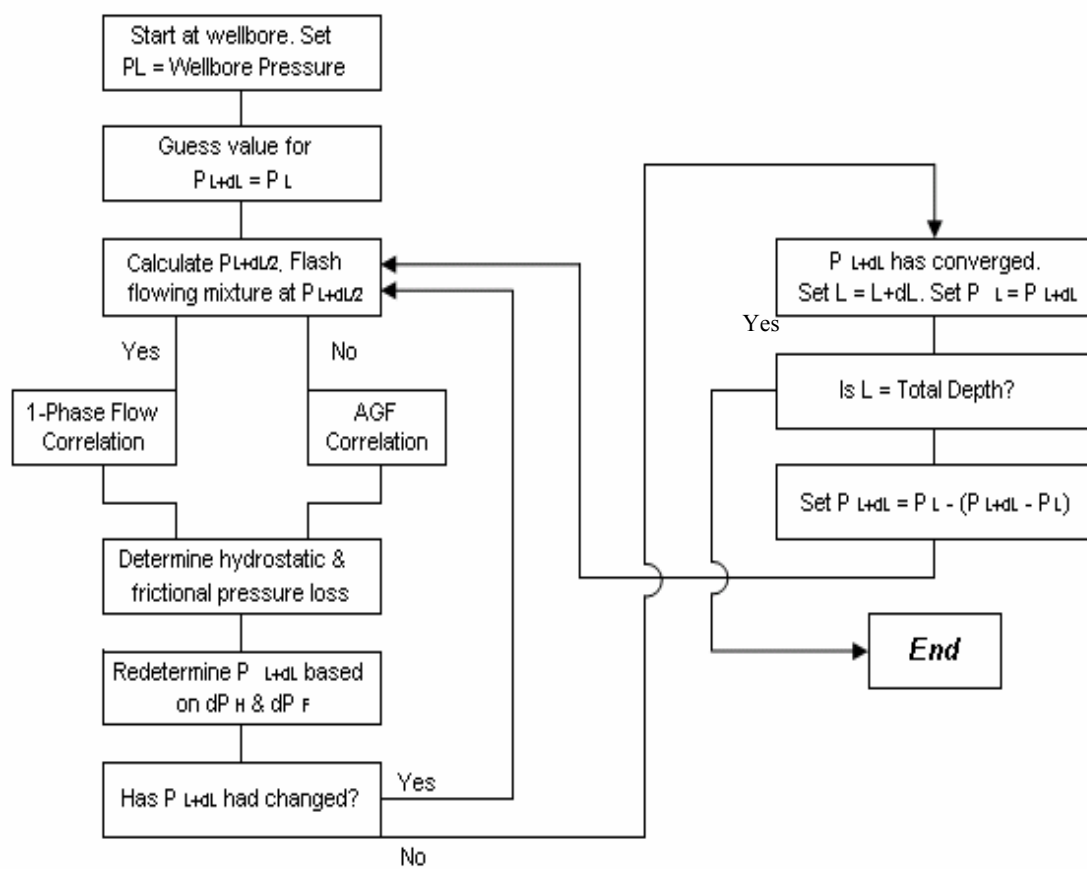
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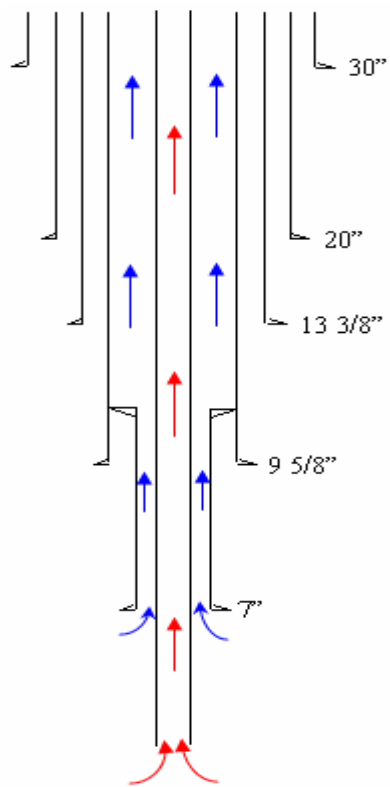
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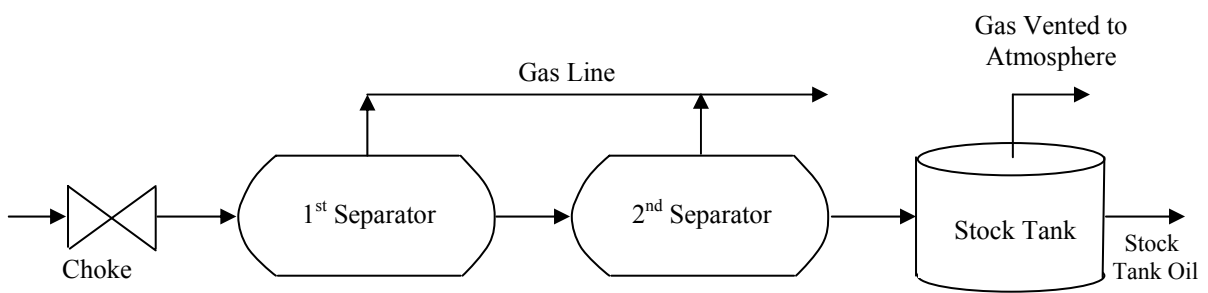
تقدير و تشکر



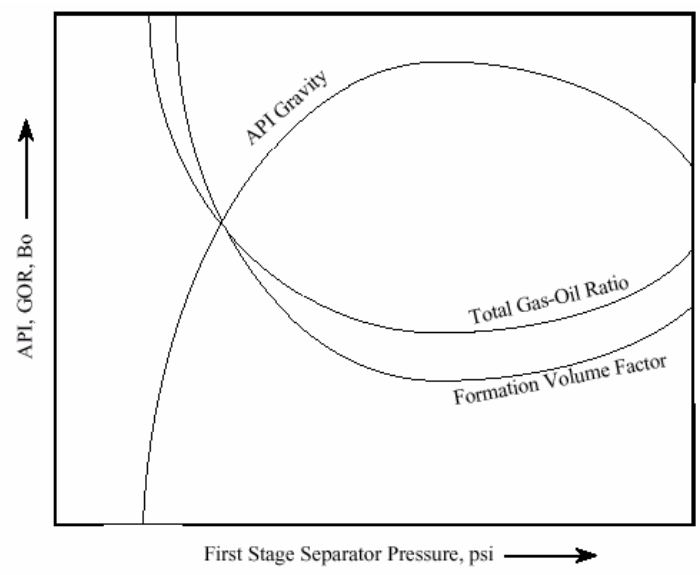
شکل ۴: رویه مورد استفاده برای تعیین توزیع فشار در لوله مغزی.



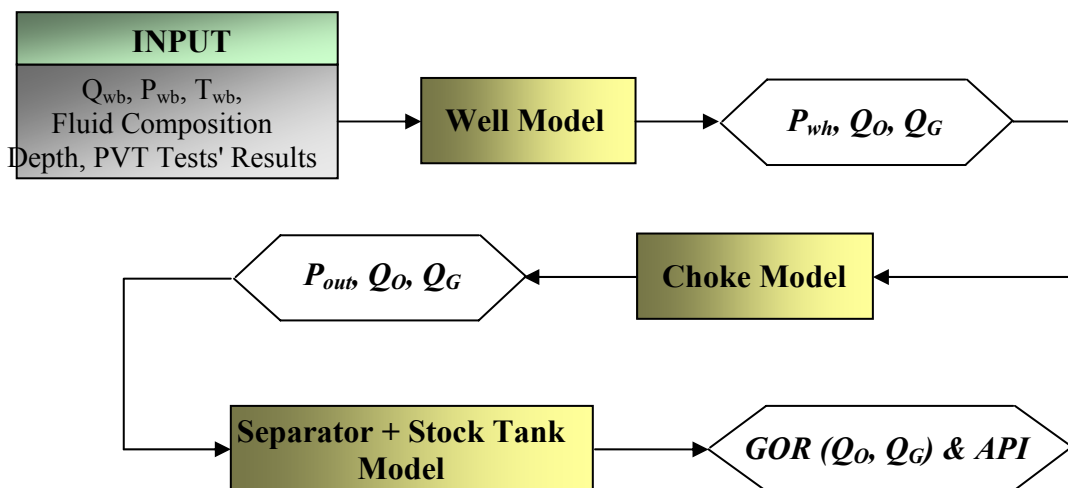
شکل ۵: نمائی از لوله مغزی با سایز دو گانه.



شکل ۶: مراحل تفکیک نفت و گاز پس از عبور از کاهنده.



شکل ۷: اثر فشار تفکیک کننده در کیفیت نفت خروجی.



شکل ۸: مدل کامل طراحی شده در نرم افزار.

جدول ۱: مقایسه نتایج نرم افزارهای شبیه ساز با نتایج برنامه نوشته شده.

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واژه های انگلیسی به ترتیب استفاده در متن

1 - Stochastic	2 - Performance	3 - Reservoir Characterization
4 - Gas Lift	5 - Water Flooding	6 - Linear Optimization
7 - Nonlinear Optimization	8 - Stochastic	9 - Population
10 - Chromosome	11 - Generations	12 - Fitness
13 - Evaluation	14 - Offspring	15 - Crossover
16 - Parent	17 - Mutation	18 - Selection
19 - Optimum	20 - Objective Function	21 - Penalty Functions
22 - Gene	23 - Binary	24 - Encode
25 - Decode	26 - Probability of Crossover	27 - Random Cut-Point
28 - Local Optima	29 - Global Optima	30 - Maximization
31 - Minimization	32 - Tubing	33 - Choke
34 - Separators	35 - Critical	36 - Subcritical
37 - Stock Tank	38 - Bubble	39 - Slug
40 - Transition	41 - Annular-Mist	42 - Wellbore Pressure
43 - Step	44 - Liquid Holdup	45 - Wellhead
46 - Choke Model	47 - Back Pressure	48 - Slugging
49 - Critical Flow	50 - Separator Model	51 - Flare
52 - Differential Liberation	53 - Flash Calculation	54 - Gas Oil Ratio
55 - Liner Shoe	56 - Total Depth	