

An Innovative Method for Hydraulic Fracturing Optimization

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**Hydraulic
Fracturing**

Intuition

Models

Algorithm

Results



Vertical hydraulic Fracturing Process

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Vertical hydraulic Fracturing Process

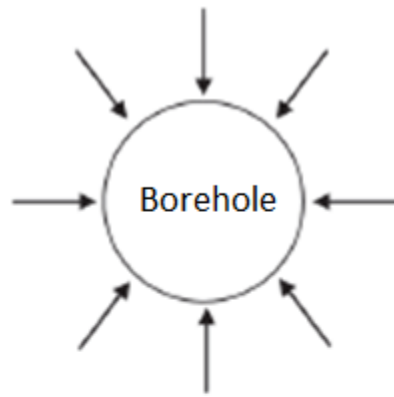
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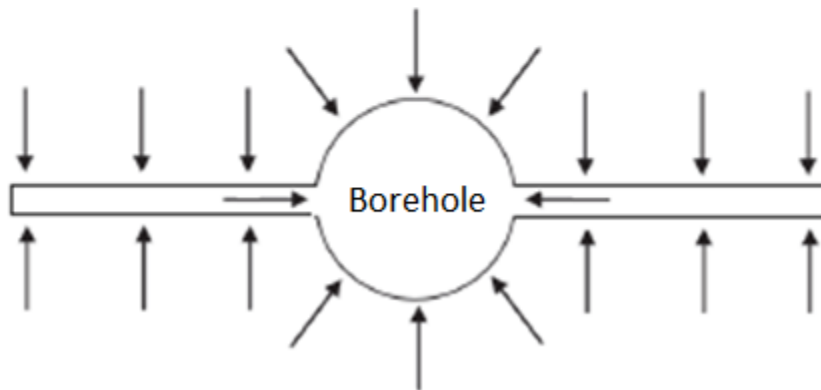
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Radial flow



Near linear flow

Near-wellbore flow



Downhole fracture imaging

Hydraulic
Fracturing

Intuition

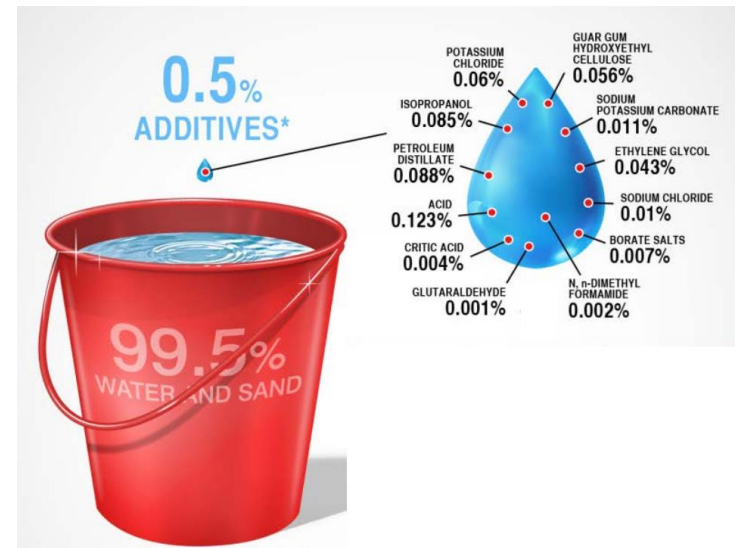
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Main fracturing materials and equipments

1. Fracturing fluid
2. Closure preventer material (proppant)
3. High pressure pumps
4. Mixing devices



**Hydraulic
Fracturing**

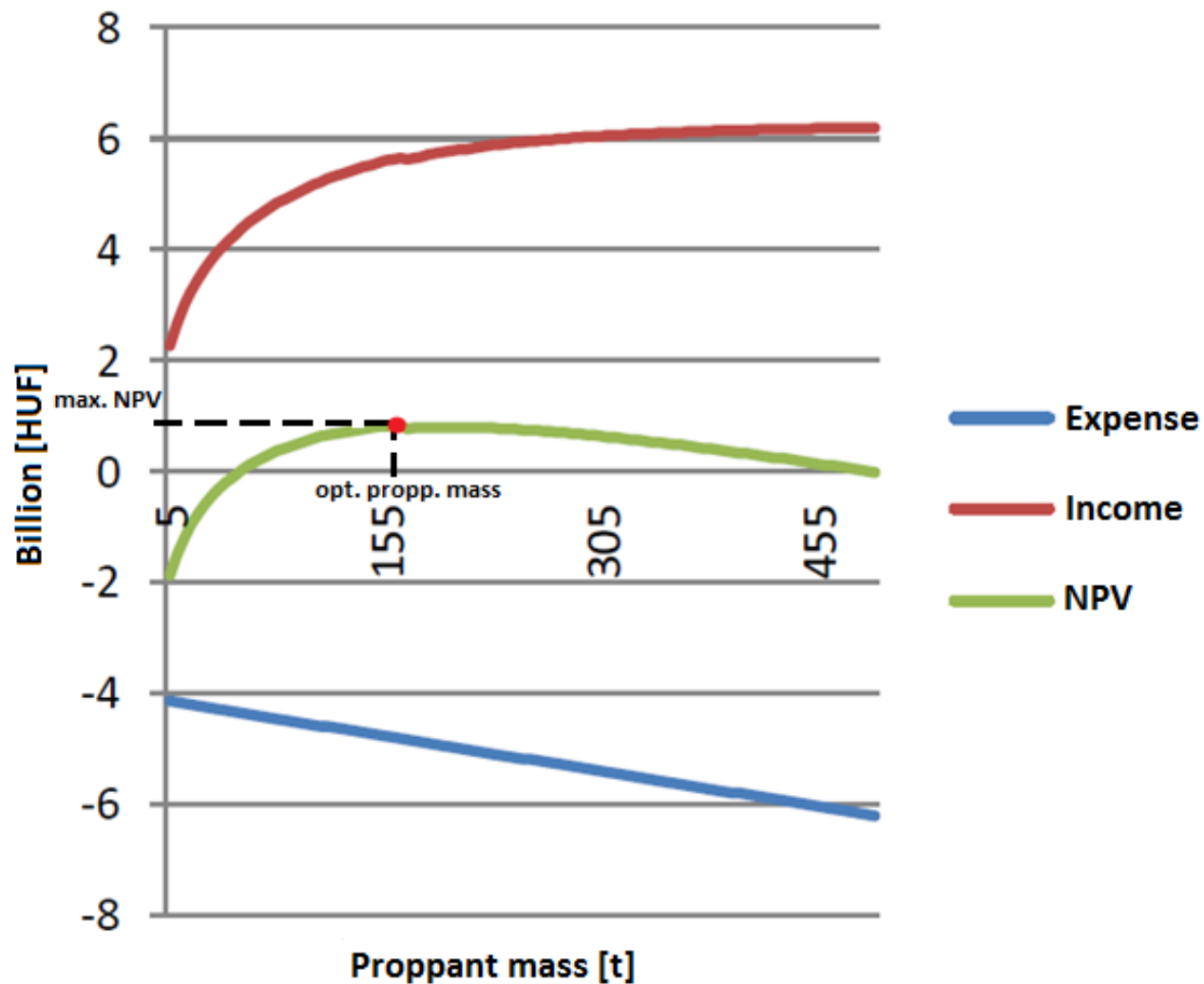
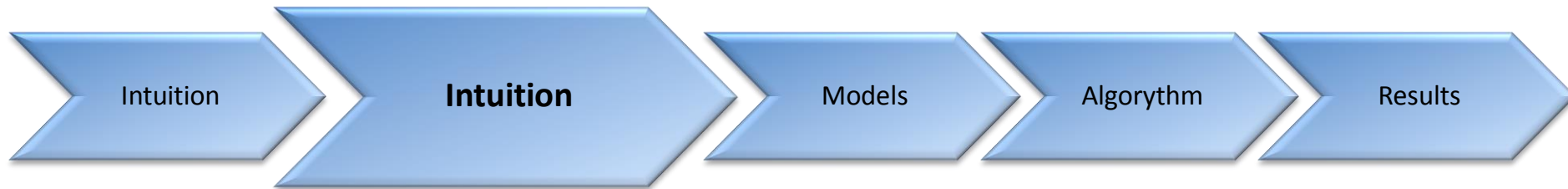
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NPV curve of a hydraulic fracturing treatment

Intuition

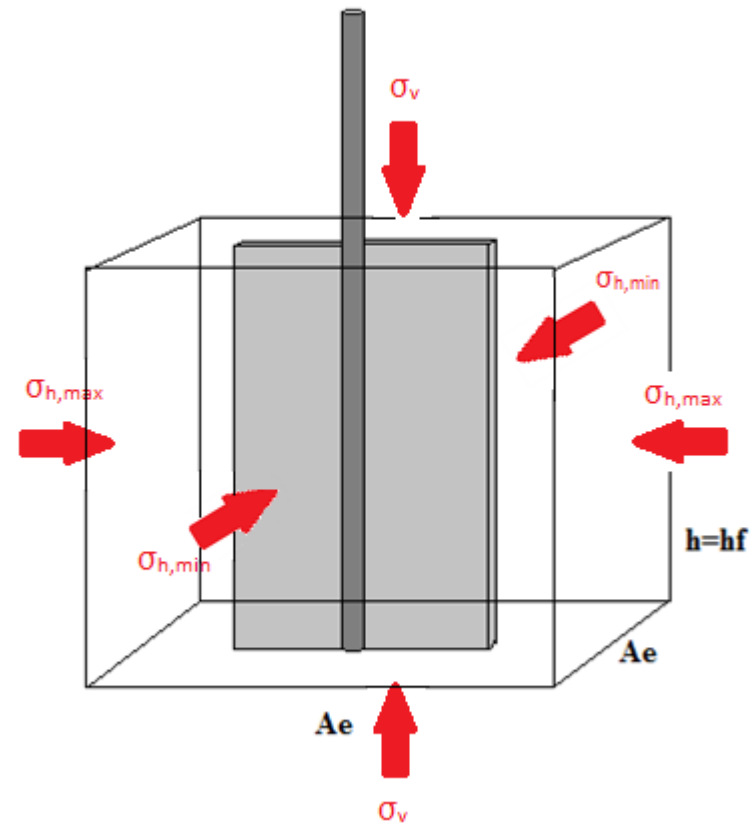
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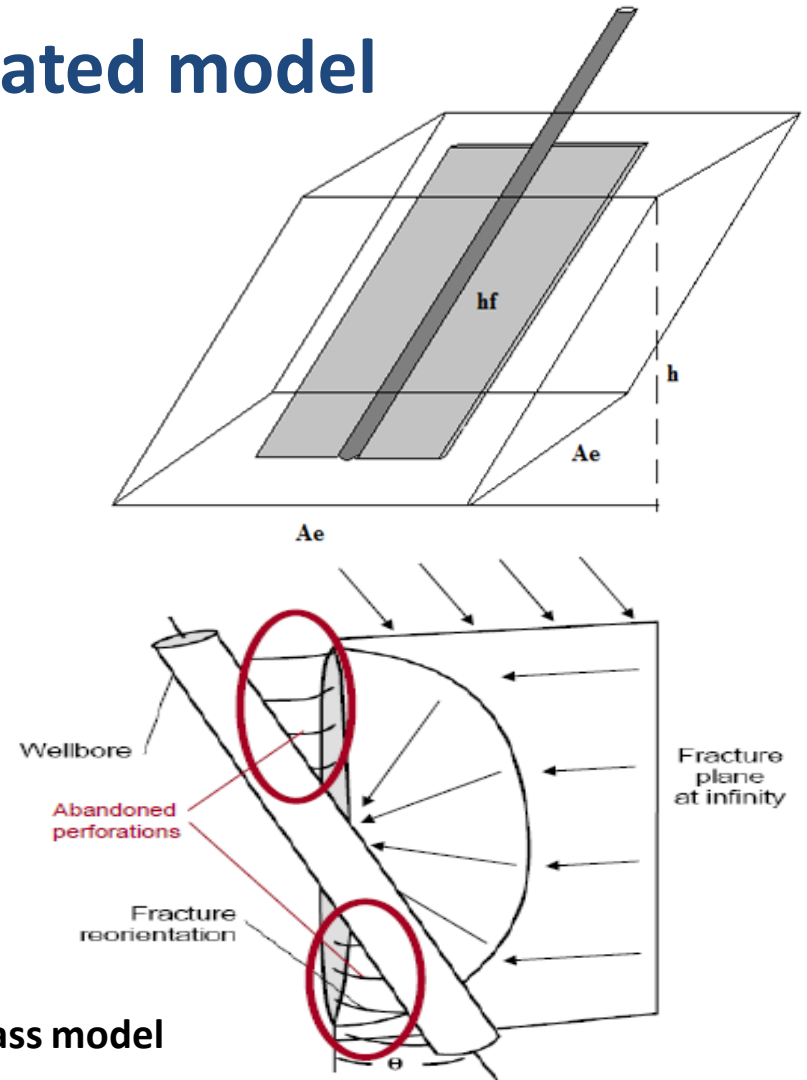
Results

- Vertical model



Supposed geometry of the fracture and the drainage area in case vertical well

- Deviated model

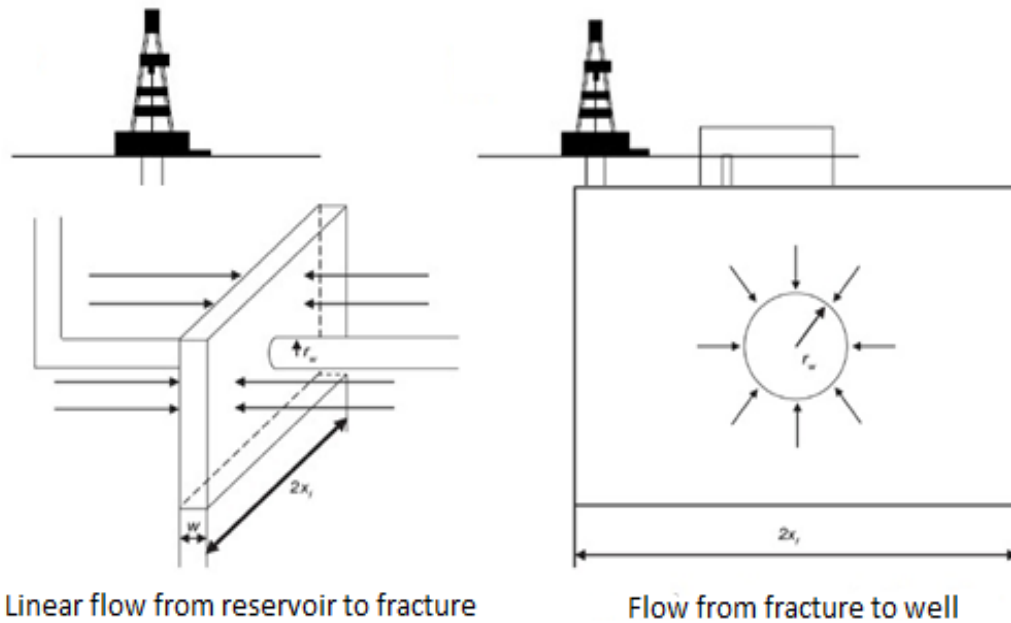


No-bypass model

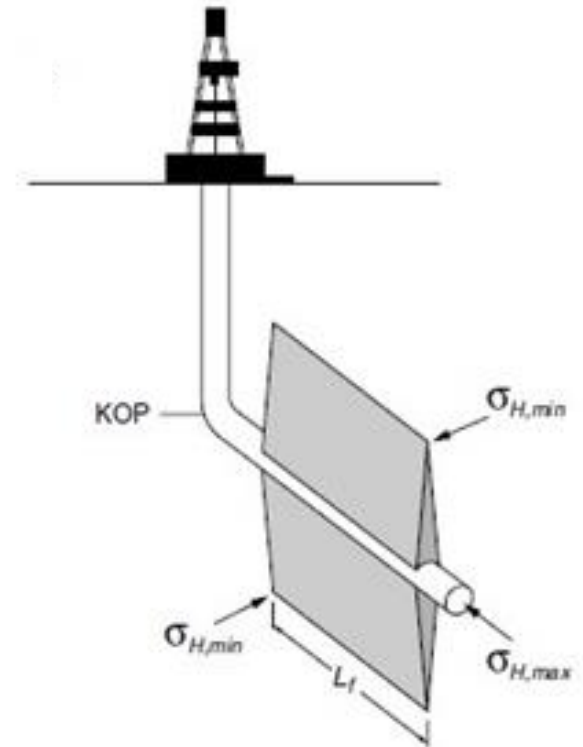


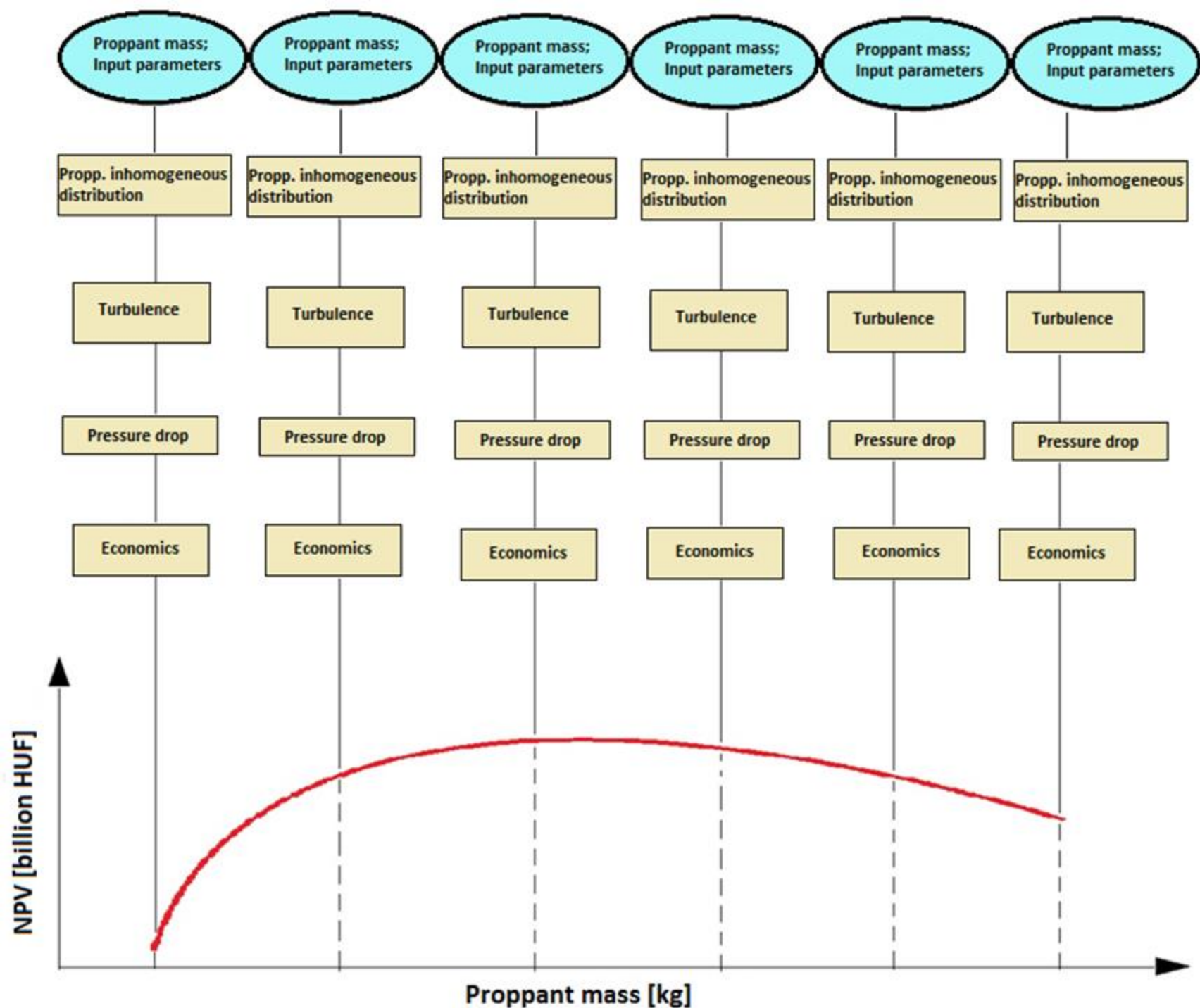
- **Horizontal models**

- **Transversal**



- **Longitudinal**





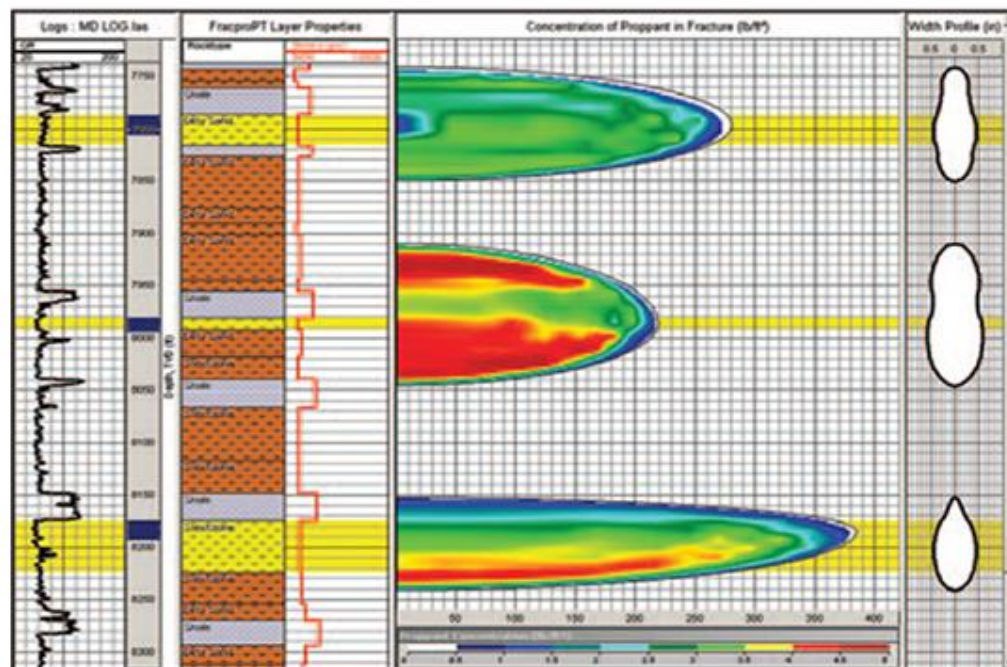
Proppant mass;
Input parameters

Propp. inhomogeneous
distribution

Turbulence

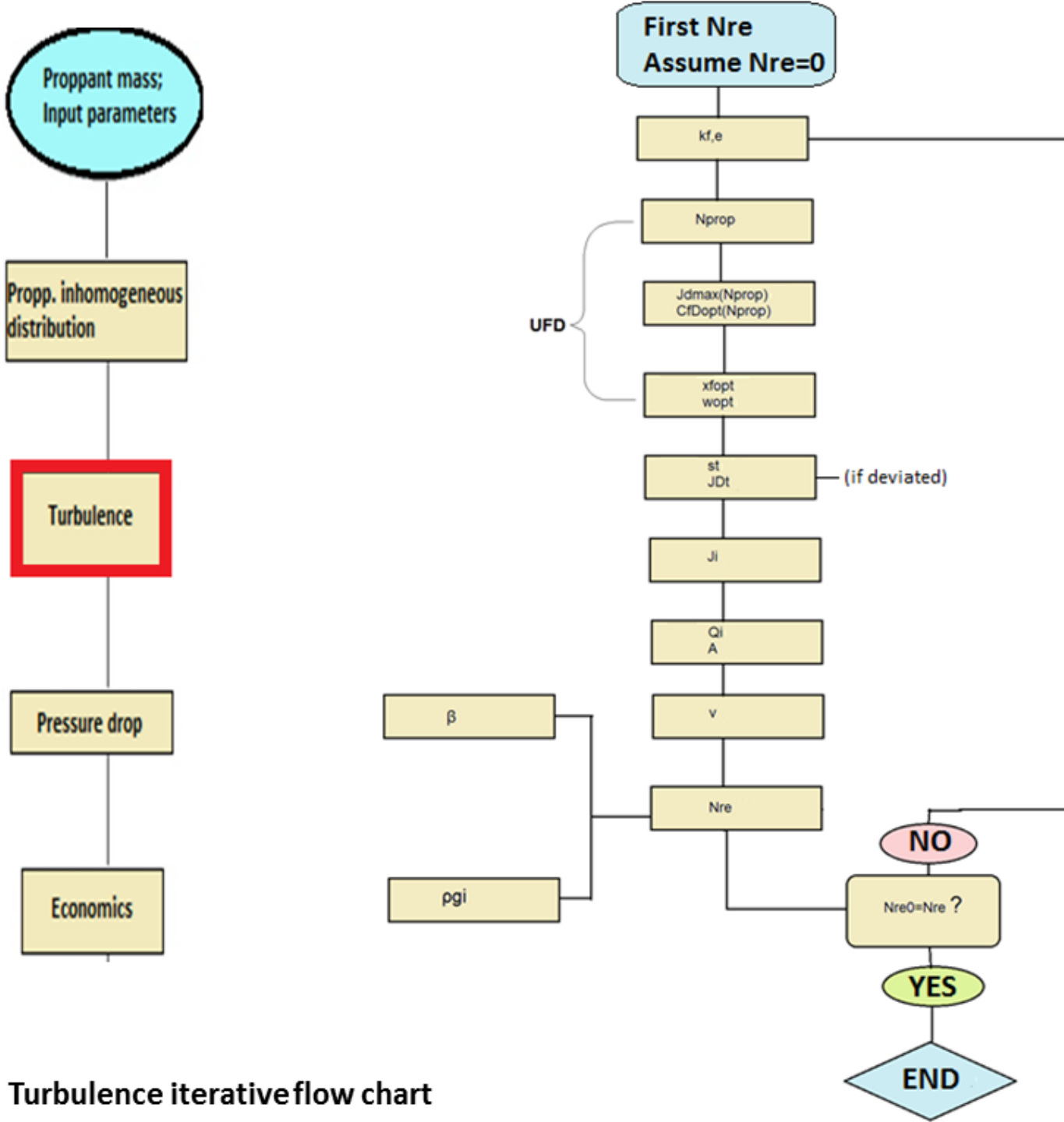
Pressure drop

Economics



	A	B	C	D	E	F	G	H	I	J	K
1	Proppant inhomogeneous distribution										
2											
3		Vertical section									
4	Horizontal sections	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
5	1.	100	84	76	68	60	52	44	28	0	0
6	2.	100	92	84	76	68	60	52	44	28	0
7	3.	100	92	84	76	68	60	52	44	36	28
8	4.	100	92	84	76	68	60	52	44	36	28
9											
10	Average value										
11		0,599									
12											

Proppant inhomogeneous distribution



Turbulence iterative flow chart

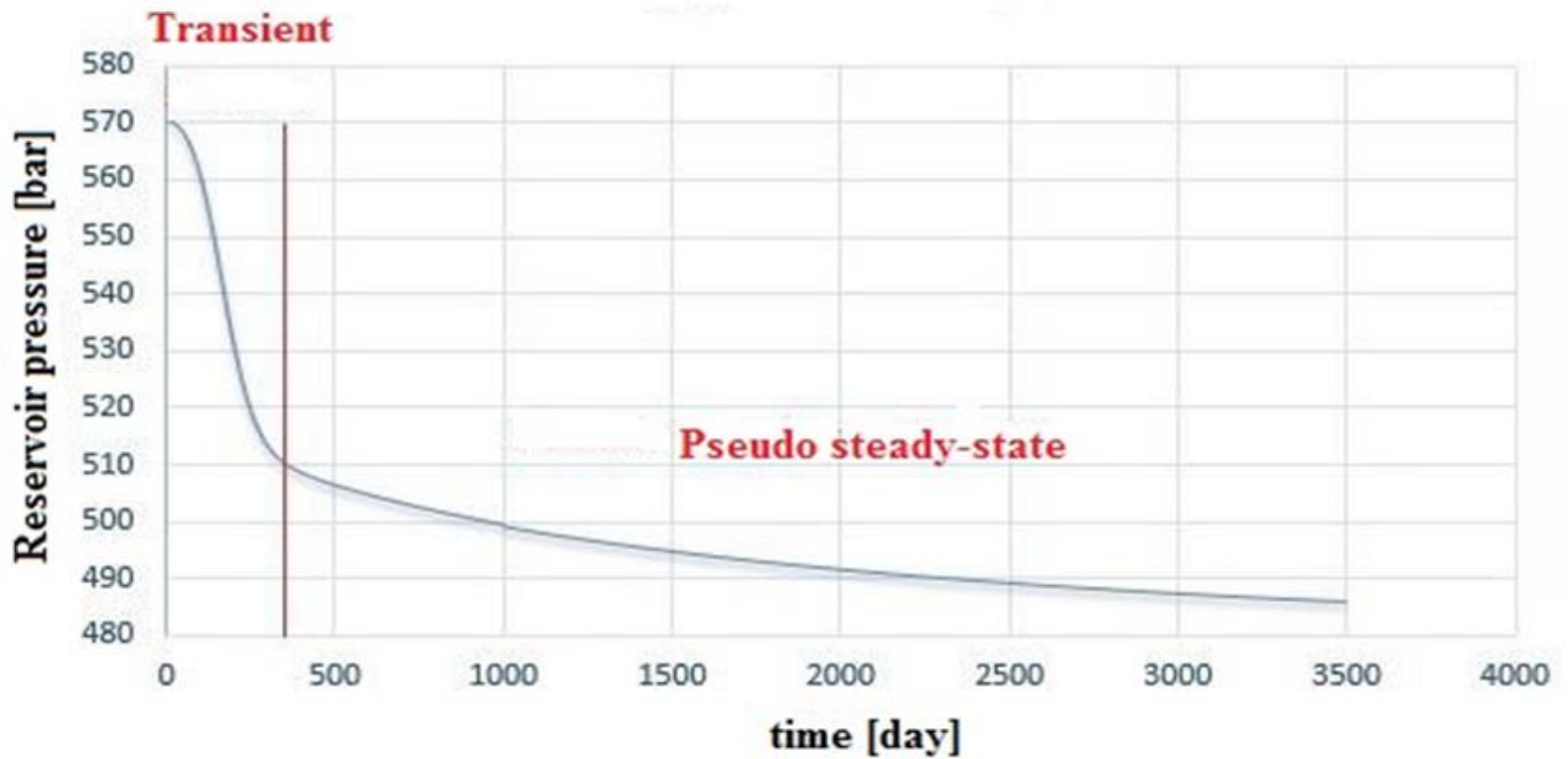
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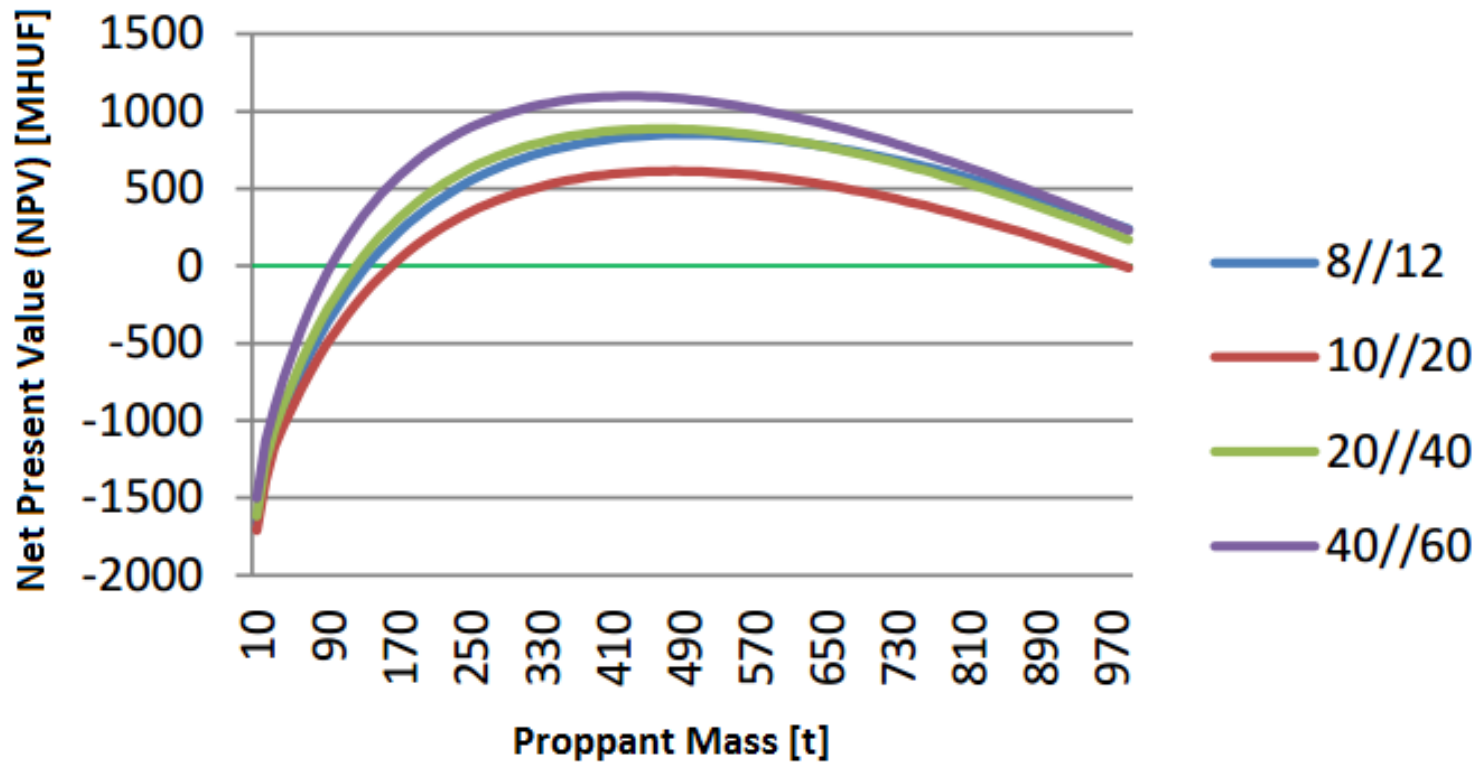
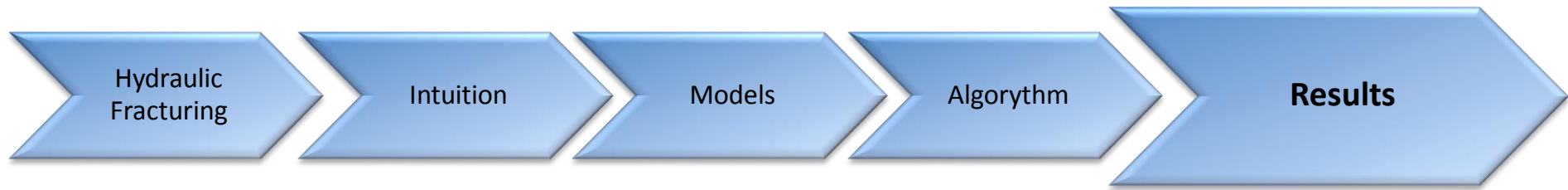
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Economics



$$G_p = G_i * \left(1 - \frac{\frac{p}{z}}{\frac{p_i}{z_i}} \right)$$



REFERENCES:

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Thank you for your attention!

Jó Szerencsét!