

Pressure Transient Analysis = PTA

Interpretation workflow of [pressure transitions](#) in [pressure test](#) data in terms of [well](#) properties and [formation](#) properties of connected [subsurface reservoirs](#).

It may refer to analysis of a stand-alone [pressure transient](#) or several [pressure transients](#) (MRST) and may also cover transitions in off-set wells (PIT).

Both downhole ([BHP](#)) and surface ([THP](#)) pressure records can be a source data to [PTA](#).

The quantitative interpretation of [pressure transitions](#) is based on [pressure diffusion model](#).

[Formation pressure](#) p_i , [skin-factor](#) S , [transmissibility](#) σ and [pressure diffusivity](#) χ are called [basic diffusion model parameters](#) as they are essential components of all diffusion models.

Below are the major types of [PTA](#) with abbreviation and indication of [well flow status](#) during the test:

Drawdown Test	Injection Test	Build-up Test	Fall off Test	Multirate Step Test	Pressure Interference Test
DD	INS	BUS	FOS	MRST	PIT
Producer	Injector	Producer	Injector	Producer / Injector	Producer / Injector Producer / Injector
FLOWING	FLOWING	SHUT-IN	SHUT-IN	FLOWING	FLOWING SHUT-IN

Objectives

Primary deliverables	Math Symbol	Conditional Deliverables	Math Symbol
Current Formation pressure	p_e	Initial formation pressure assuming no or little historical interference with offset wells	p_i
Skin-factor	S	Formation damage as permeability deterioration assuming damage penetration is known Formation damage penetration assuming damage value is known Fracture-network development around the well	

Formation transmissibility	σ	Permeability assuming flowing thickness h is known Flowing thickness assuming permeability k is known Water-oil column assuming permeability k and flowing thickness h are both known	k h h_{owc}
Minimum drainable volume around the well	V_ϕ	Minimum hydrocarbon reserves around the well Drainage area around the well assuming flowing thickness h is known Flowing thickness assuming the drainage area A around the well is known Boundary proximity assuming the circular boundary	V_{hc} A_e h r_e
Minimum drainable area around the well	A_e	Half-size of drainage area r_e providing the shape of the drainable area is known	
Boundary type	$PSS, SS, BAFFLE$		
Effective horizontal section	L_f		
Hydraulic fracture size	X_f		
Dynamic fracture opening threshold	δP_{X_f}		
Proximity r_{ext} of the remote reservoir composition Transmissibility σ_{ext} of the remote reservoir composition	W_{ch}, D_{ch} R_{owf} R_{ogf}	Channel width and proximity to its nearest boundary Proximity to oil-water front Proximity to oil-gas front	
Scanning area around the well	A_{scan}	Scanning radius of the area r_{scan} around the well assuming radial isobaric propagation	

Interpretation

PTA Type Library	PTA Sensitivity Analysis	Type-Curve Matching
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Samples

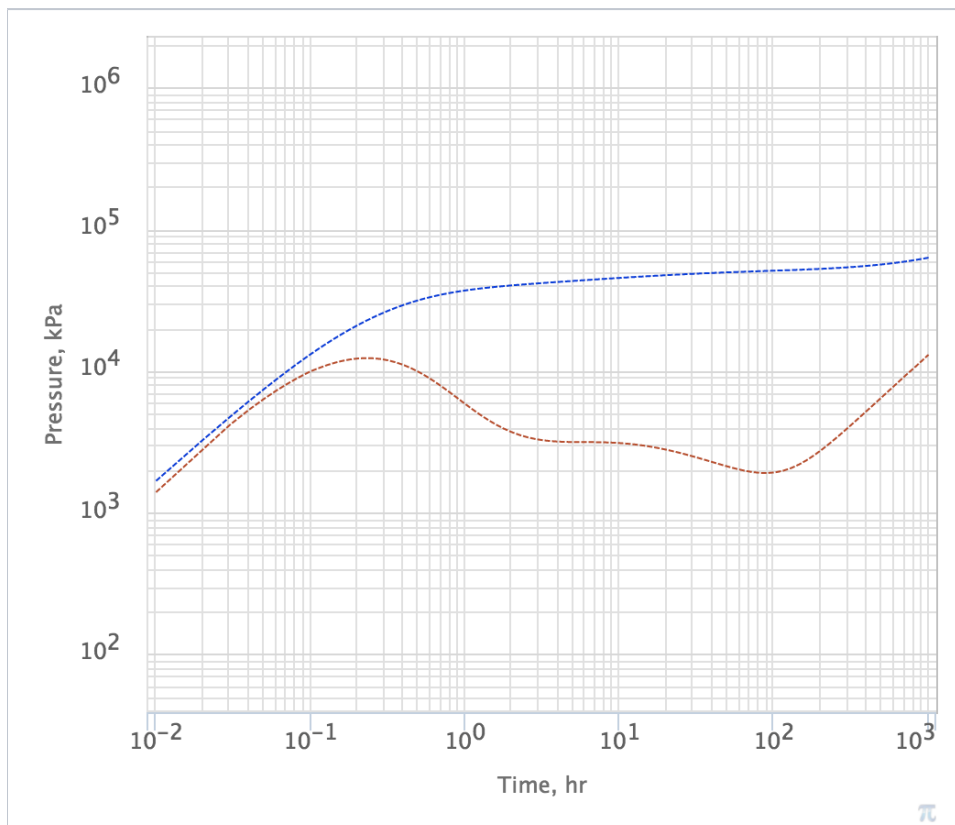


Fig. 1. Transient response in [vertical well](#).

[Pressure drop](#) is in [blue](#) and [log-derivate](#) of [Pressure drop](#) is in [red](#)

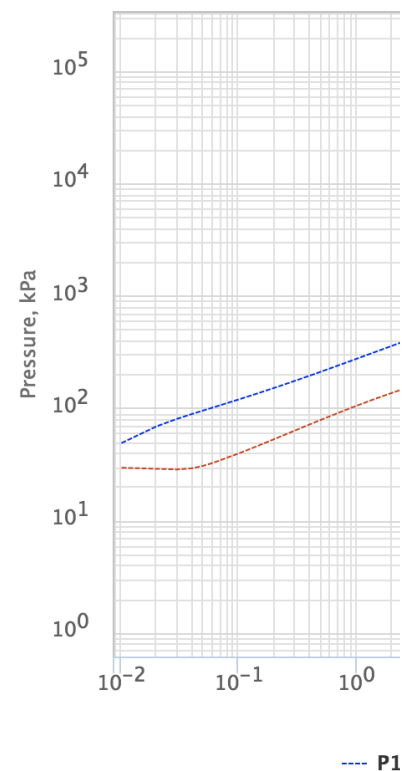


Fig. 2. Transient response in [horizc](#)

[Pressure drop](#) is in [blue](#) and [log-dei](#)

See Also

[Petroleum Industry](#) / [Upstream](#) / [Subsurface E&P Disciplines](#) / [Well Testing](#) / [Pressure Testing](#)

[[Well & Reservoir Surveillance](#)] [[PTA Diagnostic Plot](#)]

[[Rate Transient Analysis \(RTA\)](#)]

References