# Infinite Acting Radial Flow = IARF

Time interval of pressure transition when pressure drop $\delta p$ is evolving logarithmically in time:

(1) $$\delta p = p_{wf}(0) - p_{wf}(t) \sim p_{wf}(0) - p_i - \frac{q_t}{4\pi\sigma}\left[-2S + \gamma - \ln\left(\frac{4\chi t}{r_w^2}\right)\right]$$

and hence the pressure log-derivative stays constant:

(2) $$\delta p' = \frac{d\,\Delta p}{d\,\ln t} = \frac{q_t}{4\pi\sigma} = \text{const}$$

Since IARF is normally used to define a flow regime during a certain finite period of time, the term "infinite acting" is a misnomer.

This pressure diffusion regime is native to radial fluid flow in vertical well, homogeneous reservoir and no boundary (see **Fig. 1**).

The other popular occurrence of IARF is before PSS (**Fig. 2**) and SS (**Fig. 3**).

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| **Fig. 1**. PTA Diagnostic Plot with IARF regime developing after 100 hrs | **Fig. 2**. PTA Diagnostic Plot with IARF regime developing after 100 hrs until PSS at 1,000 hrs | **Fig. 3**. PTA Diagnostic Plot with IARF regime developing after 100 hrs until SS at 1,000 hrs |

## See Also

Petroleum Industry / Upstream / Subsurface E&P Disciplines / Field Study & Modelling / Reservoir Flow Simulation

[ Pressure Testing ] [ Boundary Dominated Flow (BDF) ]