Multilayer Pressure Interference Test @ model

The pressure interference test with multiple homogeneous layers staying in a permeable contact with each other will honour the following equations:

(1) $$\langle \sigma \rangle = \sum_m \sigma_m$$

(2) $$\langle c_t \phi h A \rangle = \sum_m c_{tm} \phi_m h_m A_m$$

where

m	number of layers
$\langle \sigma \rangle$	transmissibility of the multilayer system
$\langle c_t\ \phi\ h\ A \rangle$	total reservoir storage of the multilayer system
A_m	reservoir drainage area of the m-th layer
$\sigma_m = M_m h_m$	transmissibility of the m-th layer
h_m	reservoir thickness of the m-th layer
$M_m = k_m M_{rm}$	reservoir fluid mobility of the m-th layer
$M_{rm} = \left\langle \frac{k_r}{\mu} \right\rangle_m$	relative reservoir fluid mobility of the m-th layer
k_m	absolute permeability to air of the m-th layer
ϕ_m	reservoir porosity of the m-th layer
c_{tm}	total compressibility of the m-th layer

The equations (1) and (2) define the 3D 2D upscaling algorithm for pressure calculations.

See Also

Petroleum Industry / Upstream / Subsurface E&P Disciplines / Well Testing / Pressure Testing / Pressure Interference Test (PIT)