Dix'formula: from V_{RMS} to $V_{Interval}$

(Ta3520)

Dix'formula

Start from **root-mean-square velocity** c_{RMS} :

$$c_{rms,N}^2 = \frac{1}{T_{tot,N}(0)} \sum_{i=1}^{N} c_i^2 T_i(0)$$

Take $N = 2$ and $N = 3$:

$$c_{rms,2}^2 = \frac{c_1^2 T_1(0) + c_2^2 T_2(0)}{T_1(0) + T_2(0)}$$

$$c_{rms,3}^2 = \frac{c_1^2 T_1(0) + c_2^2 T_2(0) + c_3^2 T_3(0)}{T_1(0) + T_2(0) + T_3(0)}$$

Subtract:

$$c_{rms,3}^2(T_1(0)+T_2(0)+T_3(0)) - c_{rms,2}^2(T_1(0)+T_2(0)) = c_3^2 T_3(0)$$

This gives **interval velocity** c_3 :

$$c_3 = \left(\frac{c_{rms,3}^2 T_{tot,3}(0) - c_{rms,2}^2 T_{tot,2}(0)}{T_{tot,3}(0) - T_{tot,2}(0)} \right)^{1/2}$$

This is Dix formula:
it derives the interval velocity from root-mean-square (NMO/stacking) velocities.