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Dik : $n_1 = 1,48$ $n_2 = 1,475$ $L = 75$ km
$D_{mat} = 60$ ps/km-nm $D_{wg} = 1$ ps/km-nm $\sigma_\lambda = 50$ nm

Dit : σ_{mat} = ...? ; σ_{wg} = ...? ; σ_{imod} = ...? ; σ_{amod} = ...? ; σ_{tot} = ...?

Jawab :

$\sigma_{mat} = D_{mat} \cdot L \cdot \sigma_\lambda$

$= 60$ ps/km-nm $\cdot$ 75 km $\cdot$ 50 nm

$= 225.000$ ps $= 2,25 \times 10^5$ ps

$\sigma_{wg} = D_{wg} \cdot L \cdot \sigma_\lambda$

$= 1$ ps/km-nm $\cdot$ 75 km $\cdot$ 50 nm

$= 3750$ ps

$\sigma_{imod} = \sqrt{\sigma_{mat}^2 + \sigma_{wg}^2}$

$= \sqrt{(2,25 \times 10^5)^2 + (3750)^2}$

$= 225031,25$ ps

$\sigma_{amod} = \frac{n_1 \cdot \Delta \cdot L}{c}$ ⟵ $\Delta = \frac{n_1 - n_2}{n_1}$

$= \frac{(n_1 - n_2) L}{c} = \frac{(1,48 - 1,475)\ 75 \text{ km}}{3 \times 10^8 \text{ m/s}} = 1,25 \times 10^{-6}$ s $= 1.250.000$ ps

$\sigma_{tot} = \sqrt{\sigma_{imod}^2 + \sigma_{amod}^2}$

$= \sqrt{(225.031,25)^2 + (1.250.000)^2} = 1.270.094,116$ ps