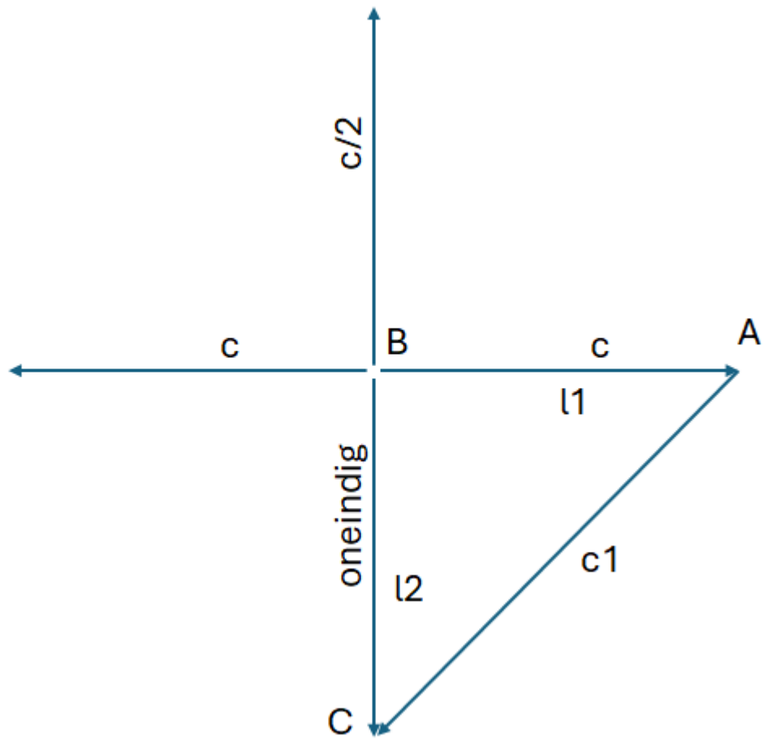
https://www.youtube.com/watch?v=xziYuItN2Cw

$g := 10^{9}$ $F := 2.5g$ $c := 3\cdot 10^{8}$ $\kappa := 0$ $cm := 10^{-2}$ $ps := 10^{-12}$ $\omega := 2\cdot\pi\cdot F$ $a(x,t,v) := \cos\left[\omega\cdot\left(t - \frac{x}{v}\right)\right]$ $x := 0, 0.1cm .. 50cm$ $Tper := \frac{1}{F}$



$\kappa x := 0$ $\kappa y := 0$ $\kappa y := 1 - 10^{-9}$

$c1(\kappa) := \frac{c}{1-\kappa}$ $c2(\kappa) := \frac{c}{1+\kappa}$ $lx := 100$ $ly := 100$ $golflengte\_0 := \frac{c}{F}$ $golflengte\_0 = 12\cdot cm$

$tx(\kappa x) := \frac{lx}{c1(\kappa x)}$ $ty(\kappa y) := \frac{ly}{c1(\kappa y)}$

$$deltat = \frac{lx}{c1(\kappa x)} + \frac{ly}{c1(\kappa y)} - \frac{\sqrt{lx^2 + ly^2}}{c1(\kappa dir)}$$

must be equal to situation with kappa=0

$$deltat = \frac{lx}{c} + \frac{lx}{c} - \frac{\sqrt{lx^2 + ly^2}}{c}$$

$$\frac{lx}{\frac{c}{1-\kappa x}} + \frac{ly}{\frac{c}{1-\kappa y}} - \frac{\sqrt{lx^2 + ly^2}}{\frac{c}{1-dir}} = \frac{lx}{c} + \frac{lx}{c} - \frac{\sqrt{lx^2 + ly^2}}{c}$$

$$\kappa dir := \frac{lx - ly + lx\cdot\kappa x + ly\cdot\kappa y}{\sqrt{lx^2 + ly^2}}$$

$$\kappa dir(\kappa x, \kappa y) := \frac{lx\cdot(1 - \kappa x) + ly\cdot(\kappa y - 1)}{\sqrt{lx^2 + ly^2}}$$

$$\frac{c1(\kappa dir(\kappa x, \kappa y))}{c} = 3.414$$

$$ttot\_ind(\kappa x, \kappa y) := \frac{lx}{c1(\kappa x)} + \frac{ly}{c1(\kappa y)}$$

$$ttotdir(\kappa x, \kappa y, \kappa dir) := \frac{\sqrt{lx^2 + ly^2}}{c1(\kappa dir)}$$

$\kappa x := 0 \qquad \kappa y := 0$

$$ttotdir(\kappa x, \kappa y) := \frac{\sqrt{lx^2 + ly^2}}{c1(\kappa dir(\kappa x, \kappa y))}$$

$$ttot\_ind(\kappa x, \kappa y) = 6.667 \times 10^{-7}$$

$\kappa dir(\kappa x, \kappa y) = 0$ $\qquad \frac{c1(\kappa dir(\kappa x, \kappa y))}{c} = 1$

$$ttotdir(\kappa x, \kappa y) = 4.714 \times 10^{-7}$$

$$ttot\_ind(\kappa x, \kappa y) - ttotdir(\kappa x, \kappa y) = 1.953 \times 10^{-7}$$

$\kappa x := 0 \qquad \kappa y := 1 - 10^{-10}$

$$ttotdir(\kappa x, \kappa y) := \frac{\sqrt{lx^2 + ly^2}}{c1(\kappa dir(\kappa x, \kappa y))}$$

$$ttot\_ind(\kappa x, \kappa y) = 3.333 \times 10^{-7}$$

$\kappa dir(\kappa x, \kappa y) = 0.707$

$$ttotdir(\kappa x, \kappa y) = 1.381 \times 10^{-7} \qquad \frac{c1(\kappa dir(\kappa x, \kappa y))}{c} = 3.414$$

$$ttot\_ind(\kappa x, \kappa y) - ttotdir(\kappa x, \kappa y) = 1.953 \times 10^{-7}$$