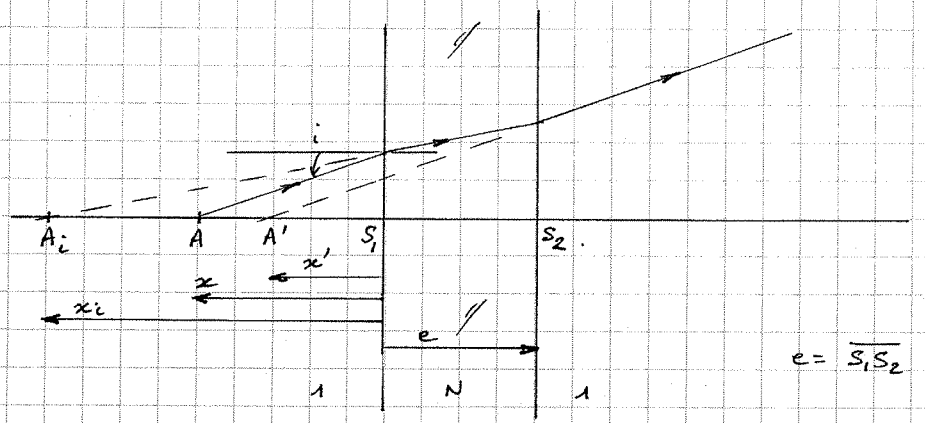
Exercise 5 - Homework n° 2 - Flat window in the paraxial approximation



$e = \overline{S_1 S_2}$

1st dioptre: $A \rightarrow A_i$: $\frac{x_i}{N} = \frac{x}{1}$. using result of Exercise 4 a)

2nd dioptre: $A_i \rightarrow A'$: $\frac{-e+x'}{1} = \frac{-e+x_i}{N}$

so $x' = e + \frac{x_i - e}{N}$

$= e\left(1 - \frac{1}{N}\right) + x$.

so $\boxed{\overline{AA'} = x' - x = e\left(1 - \frac{1}{N}\right)}$

This is what we obtained in Exercise 2 - Homework 1, in the paraxial approximation (i very small)