Equation 1: number of fissures

Assumptions:

- F_{fis} is the fraction of the cell are covered with fissures
- the cell is a square: $\Delta x=\Delta y$
- fissures are evenly distributed throughout the cell and they are perpendicular to each other
- the number of fissures in x direction is equal the number of fissure in y direction: $N_{fis,x} = N_{fis,y}$
- fissure length is equal the length of the cell: $L_{fis} = \Delta x=\Delta y$

$$N_{fis,x} \cdot \Delta x \cdot a_{fis} + N_{fis,y} \cdot \Delta x \cdot a_{fis} - N_{fis,x} \cdot N_{fis,y} \cdot a_{fis}^{\ 2} = F_{fis} \Delta x^2$$

$$2N_{fis,x} \cdot \Delta x \cdot a_{fis} - N_{fis,x}^{\ 2} \cdot a_{fis}^{\ 2} = F_{fis} \Delta x^2$$

$$N_{fis,x} = N_{fis,y} = (1 - \sqrt{1 - F_{fis}}) \frac{\Delta x}{a_{fis}}$$

Equation 2: length of matrix block

Assumptions:

- all fissures in the cell are bounded by matrix blocks
- the number of matrix blocks in x and y direction is the same and equal: $N_{mat,x}=N_{mat,y} = N_{fis,x}+1= N_{fis,y}+1$
- the total number of matrix blocks within the cell is: $(N_{fis,x}+1)* (N_{fis,y}+1)$

$$L_{mat} \cdot L_{mat} \cdot (N_{fis,x} + 1) \cdot (N_{fis,x} + 1) = (1 - F_{fis}) \cdot \Delta x^2$$

$$L_{mat} = \sqrt{1 - F_{fis}} \frac{\Delta x}{N_{fis,x} + 1}$$