- Let r_k be the final rent for tenant k.
- Let i_k be the income of tenant k.
- Let R be the total rent.
- Let c be the constant residual money, each tenant has after paying rent.
- Let a_k be tenant k's living space. Own room plus $\frac{1}{t}$ of the communal space.

1 equal residual money among tenants. income weighted by living area quotient

$$i_1 - r_1 = c \tag{1}$$
$$i_2 - r_2 = c \tag{2}$$
$$i_3 - r_3 = c \tag{3}$$
$$\dots \tag{4}$$

$$0c + r_1 + r_2 + r_3 = R \tag{5}$$
$$-c - r_1 = -i_1 q_1 \tag{6}$$
$$-c - r_2 = -i_2 q_2 \tag{7}$$
$$-c - r_3 = -i_3 q_3 \tag{8}$$
$$\dots \tag{9}$$

where

$$q_k = \frac{a_k}{a_{mean}} \tag{10}$$

solve with Gaussian Elimination...

2 rent share is proportional to income weighted by living area quotient

$$r_1 = \frac{\zeta_1}{\beta} R \tag{11}$$

$$\zeta_1 = i_1 q_1 \tag{12}$$

$$\beta = \sum_{k=1}^{t} \zeta_k \tag{13}$$

3 rent per area only

set all i to 1...

$$r_1 = \frac{\zeta_1}{\beta} R \tag{14}$$

$$\zeta_1 = q_1 \tag{15}$$

$$\beta = \sum_{k=1}^{t} q_k = 1 \tag{16}$$

$\rightarrow$

$$r_1 = q_1 R \tag{17}$$