We want to minimize $\underset{\gamma}{\text{minimize}} \quad \iota_{C_1 \cap C_2}(\gamma) + \frac{1}{2}\|\gamma - \tilde{\gamma}\|^2$ (*)

where $\tilde{\gamma}$ = point to compute the projection

$$C_1 = \left\{ \gamma \in \mathbb{R}_+^{M \times N} \;\middle|\; \forall i \in \{1, \dots M\} \quad \sum_j \gamma_{ij} = m_i \right\}$$

$$C_2 = \left\{ \gamma \in \mathbb{R}_+^{M \times N} \;\middle|\; \forall j \in \{1, \dots N\} \quad \sum_i \gamma_{ij} = m_j \right\}$$

<u>Remark</u>: P_{C_1} and P_{C_2} are available on the prox-repository website.

<u>Remark</u>: You proposed to use Algo 3.2 from article of Combettes, Dung and Vũ.

Algo to solve (*)

Let $\tilde{\gamma} \in \mathbb{R}^{M \times N}$ (provided by the gradient step of your FB algo)

$v_{1,0} = \tilde{\gamma}$ and $v_{2,0} = \tilde{\gamma}$

$\sigma = 1.9$

For $k = 0, 1, \dots$

$$\gamma_k = \tilde{\gamma} - \frac{1}{2}\left(v_{1,k} + v_{2,k}\right)$$

$$v_{1,k+1} = v_{1,k} + \sigma\left(\gamma_k - P_{C_1}\left(\sigma^{-1} v_{1,k} + \gamma_k\right)\right)$$

$$v_{2,k+1} = v_{2,k} + \sigma\left(\gamma_k - P_{C_2}\left(\sigma^{-1} v_{2,k} + \gamma_k\right)\right)$$

<u>Remark</u>: You need to find "smart" initialisations for v_1 and v_2

<u>Remark</u>: You need to have a "smart" stopping criteria (i.e. check that constraints are satisfied)