

$$\text{Store No.} \quad ns := 1 \quad \text{Store} := \left( n_{ini}^{(1)} \right)_{ns} \quad \text{Store} = 3411$$

$$Ni := \sum_{k=1}^{36} \left( n_{ini}^{(1+k)} \right)_{ns} \quad Nr := \sum_{k=1}^{36} \left( n_{rh}^{(1+k)} \right)_{ns} \quad 1 - \frac{Nr}{Ni} = 0.019 \quad \text{Total losses due to scraping}$$

$$AcutV_{ns} = 9.15 \quad \lambda cutH_{ns} = 50 \quad \text{Cut-off apertures (relative units)}$$

$$dNV_j := 1 - \int_0^{AcutV_{ns}} \frac{2}{\sqrt{2\pi \cdot \left[ \left( V_{ini}^{(1+j)} \right)_{ns} \right]}} \cdot e^{\frac{-x^2}{2 \cdot \left[ \left( V_{ini}^{(1+j)} \right)_{ns} \right]}} dx \quad \frac{2}{36} \cdot \sum_{k=1}^{36} dNV_k = 0.019$$

vertical scraping losses

$$dNH_j := 1 - \int_0^{AcutH_{ns}} \frac{2}{\sqrt{2\pi \cdot \left[ \left( H_{ini}^{(1+j)} \right)_{ns} \right]}} \cdot e^{\frac{-x^2}{2 \cdot \left[ \left( H_{ini}^{(1+j)} \right)_{ns} \right]}} dx \quad \frac{2}{36} \cdot \sum_{k=1}^{36} dNH_k = 0$$

horizontal scraping losses

$$dEV_j := \left[ \int_0^{AcutV_{ns}} \frac{2 \cdot x^2}{\sqrt{2\pi \cdot \left[ \left( V_{ini}^{(1+j)} \right)_{ns} \right]^3}} \cdot e^{\frac{-x^2}{2 \cdot \left[ \left( V_{ini}^{(1+j)} \right)_{ns} \right]}} dx \right] - 1 \quad \text{Vertical emittance shaving}$$

$$dEH_j := \left[ \int_0^{AcutH_{ns}} \frac{2 \cdot x^2}{\sqrt{2\pi \cdot \left[ \left( H_{ini}^{(1+j)} \right)_{ns} \right]^3}} \cdot e^{\frac{-x^2}{2 \cdot \left[ \left( H_{ini}^{(1+j)} \right)_{ns} \right]}} dx \right] - 1 \quad \text{Horizontal emittance shaving}$$

Emittance increase caused by Beam-Beam:

$$dEbbV_{ns} = 0.1 \quad \text{Vertical}$$

$$dEbbH_{ns} = 0 \quad \text{Horizontal}$$

