$\boldsymbol{Deviation\ Impact\ on\ MSO_g\ (for\ small\ \alpha)}$

Let,

The total number of contours be k (IC_1, IC_k)

Cost of all contours except IC_{k-1} *is deviated by* $(1+\alpha)$

Cost Incurred due to Bouquet Sequence

$$BS_{cost} = CC_{k-1} + (1+\alpha) * (CC_k + \sum_{i=1}^{k-2} CC_i)$$

Best possible cost

$$OPT_{cost} = \lim_{h \to 0} (CC_{k-1} + h) = CC_{k-1}$$

$$MSO_g = \frac{BS_{cost}}{OPT_{cost}} = \frac{(1+\alpha) * \sum_{i=1}^{k} CC_i \ - \ \alpha * CC_{k-1}}{CC_{k-1}}$$

$$= (1+\alpha) * \frac{r_{pb}^2}{r_{pb}-1} - \alpha$$

$$\leq \frac{r_{pb}^2}{r_{pb}-1} * (1+\alpha) = \frac{r_{pb}^2}{r_{pb}-1} * \eta$$

Using $r_{pb} = 4$, *we will get* MSO_g

$$4 * (1+\alpha) = 4 * \eta$$

Cost Deviation (η) *should always respect*

$$1 \leq (1+\alpha) = \eta \ll r_{pb}$$