

$$(\{r_1^1 \dots r_{n_1}^1, r_1^2 \dots r_{n_2}^2, \dots, r_1^k \dots r_{n_k}^k\}) = (r_1^1 \circ r_1^2 \dots \circ r_{n_1}^1) \cup \dots \cup (r_1^k \circ r_2^k \dots \circ r_{n_k}^k)$$