$$\sum_{i=1}^{q} \alpha_i = \bar{\alpha}.$$

When $\bar{G}(y)$ exists for some a and some matrix S, the matrix S can always be chosen such that $0 \leq \alpha_1 \leq ... \leq \alpha_q \leq \bar{\alpha}$.

Definition 4.1. *A $q \times p$ matrix of polynomials $G(y)$ satisfies the "continuity of lower degree ranks property" (CLDR) if for some non-singular $q \times q$ matrix S and for some $\alpha = (\alpha_1, ..., \alpha_q)$ such that $\sum_{i=1}^{q} \alpha_i = \bar{\alpha}$, $0 \leq \alpha_1 \leq ... \leq \alpha_q \leq \bar{\alpha}$, (15) provides a rank q matrix of polynomials $\bar{G}(y)$.*

Essentially, the CLDR property holds if for some S the transformed $SG(y)$ is such that the stabilizing rate $\bar{a}$ for the determinant is shared between the rows of the matrix $SG(y)$ according to (15), and the limit matrix is non-singular.

The matrix $\bar{G}(y)$ depends upon the choice of the matrix S. Indeed in Example 4.1 $\bar{\alpha} = 4$ but it is clear that for $S = I$ Lemma 4.1 does not hold. This is a consequence of the fact that there is a linear dependence between the degree one polynomial terms in the rows of the matrix. However setting

$$S = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 1 & 1 & -1 \end{bmatrix}$$