Some extremal problems for strictly totally positive matrices.
Linear Algebra Appl. 64 (1985), 141–156.

In this paper the author extends the relations of s-numbers of an $M \times N$ matrix relative to the norm $\| \cdot \|_2$ to the case of an $M \times N$ strictly totally positive matrix relative to the norm $\| \cdot \|_p$ ($1 \leq p \leq \infty$). The main result is that if $A$ is an $(M \times N)$-order strictly totally positive matrix, then

$$\min_{P} \max_{x \neq 0} \frac{\| (A - P)x \|_p}{\| x \|_p} = \min_{X_n} \max_{x \in X_n} \frac{\| Ax \|_p}{\| x \|_p} = \max_{X_{n+1}} \min_{x \in X_{n+1}} \frac{\| Ax \|_p}{\| x \|_p},$$

where $P$ ranges over all $M \times N$ matrices of rank $n$, $X_n$ is any subspace of $\mathbb{R}^N$ of dimension $n$ and $\| x \|_p = \left( \sum_{i=1}^{n} |x_i|^p \right)^{1/p}$.

For a related paper see a previous paper by the author [same journal 27 (1979), 245-278; MR 80k:15026].

Shao Kuan Li (Shanghai)