ASYMPTOTIC BEHAVIOR OF GELFAND–NAIMARK DECOMPOSITION

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Abstract. Let $X = L\sigma U$ be the Gelfand-Naimark decomposition of $X \in \text{GL}_n(\mathbb{C})$, where $L$ is unit lower triangular, $\sigma$ is a permutation matrix, and $U$ is upper triangular. Call $u(X) := \text{diag } U$ the $u$-component of $X$. We show that in a Zariski dense open subset of the $\omega$-orbit of certain Bruhat decomposition,

$$\lim_{m \to \infty} \left| u(X^m) \right|^{1/m} = \text{diag} (|\lambda_{\omega(1)}|, \cdots, |\lambda_{\omega(n)}|).$$

The other situations where $\lim_{m \to \infty} \left| u(X^m) \right|^{1/m}$ converge to different limits or diverge are also discussed.


Keywords and phrases: Gelfand-Naimark decomposition, Bruhat decomposition, $u$-component, eigenvalues.

REFERENCES