On the minimum growth rate of solutions to linear switched systems

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We deal with discrete-time *linear switched systems* of the form

$$x(n+1) = A_{\sigma(n)}\, x(n), \quad \sigma : \mathbf{N} \longrightarrow \{1, 2, \ldots, m\},$$

where $x(0) \in \mathbf{R}^k$, the matrix $A_{\sigma(n)} \in \mathbf{R}^{k\times k}$ belongs to a finite family $\mathcal{F} = \{A_i\}_{1\le i\le m}$ and σ denotes the *switching law*.
It is known that the *most stable switching laws* are associated to the so-called *spectrum-minimizing products*, that is those products $P = A_{i_1} A_{i_2} \cdots A_{i_k}$ whose average spectral radius $\rho(P)^{1/k}$ equals the *lower spectral radius* $\check{\rho}(\mathcal{F})$ of the family $\mathcal{F}$. For families $\mathcal{F}$ sharing an invariant cone K, in this talk we show how to provide lower bounds to $\check{\rho}(\mathcal{F})$ by a suitable adaptation of the Gelfand limit in the framework of *antinorms* (Guglielmi & Z. [**?**]).
Then we briefly consider families of matrices $\mathcal{F}$ that share an invariant *multicone* K_{mul} (Brundu & Z. [**?**, **?**]) and mention some generalizations of the known results on antinorms to this more general setting (Guglielmi & Z. [**?**]).

References

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