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$\mathcal{J}_H$-SINGULARITY AND $\mathcal{J}_H$-REGULARITY OF MULTIVARIATE STATIONARY PROCESSES OVER LCA GROUPS*

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Abstract. Let G be an LCA group, Γ its dual group, and H a closed subgroup of G such that its annihilator Λ is countable. Let M denote a regular positive semidefinite matrix-valued Borel measure on Γ and $L^2(M)$ the corresponding Hilbert space of matrix-valued functions square-integrable with respect to M. For $g \in G$, let $\mathbf{Z}_g$ be the closure in $L^2(M)$ of all matrix-valued trigonometric polynomials with frequencies from $g + H$. We describe those measures M for which $\mathbf{Z}_g = L^2(M)$ as well as those for which $\bigcap_{g \in G} \mathbf{Z}_g = \{0\}$. Interpreting M as a spectral measure of a multivariate wide sense stationary process on G and denoting by $\mathcal{J}_H$ the family of H-cosets, we obtain conditions for $\mathcal{J}_H$-singularity and $\mathcal{J}_H$-regularity.

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Key words and phrases: LCA group, multivariate stationary process, positive semidefinite matrix-valued measure, trigonometric approximation, $\mathcal{J}_H$-singularity, $\mathcal{J}_H$-regularity, sampling.

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