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On the Structure of Locally Symmetric Manifolds

This paper studies structural properties of locally symmetric submanifolds. One of the main result states that a locally symmetric submanifold \mathcal{M} of \mathbf{R}^n admits a locally symmetric tangential parametrization in an appropriately reduced ambient space. This property has its own interest and is the key element to establish, in a follow-up paper of the authors [Spectral (isotropic) manifolds and their dimension, J. Anal. Math., to appear], that the spectral set $\lambda^{-1}(\mathcal{M}) := \{X \in \mathbf{S}^n : \lambda(X) \in \mathcal{M}\}$ consisting of all $n \times n$ symmetric matrices having their eigenvalues on \mathcal{M} , is a smooth submanifold of the space of symmetric matrices \mathbf{S}^n . Here $\lambda(X)$ is the n -dimensional ordered vector of the eigenvalues of X .

Keywords: Locally symmetric manifold, spectral manifold, permutation, partition, symmetric matrix, eigenvalue.

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