

## Rigidity for the Hyperbolic Monge-Ampère Equation

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**Abstract.** Some properties of nonlinear partial differential equations are naturally associated with the geometry of sets in the space of matrices. In this paper we consider the model case when the compact set  $K$  is contained in the hyperboloid  $\mathcal{H}_{-1}$ , where  $\mathcal{H}_{-1} \subset \mathbb{M}_{\text{sym}}^{2 \times 2}$ , the set of symmetric  $2 \times 2$  matrices. The hyperboloid  $\mathcal{H}_{-1}$  is generated by two families of rank-one lines and related to the hyperbolic Monge-Ampère equation  $\det \nabla^2 u = -1$ . For some compact subsets  $K \subset \mathcal{H}_{-1}$  containing a rank-one connection, we show the rigidity property of  $K$  by imposing proper topology in the convergence of approximate solutions and affine boundary conditions.

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