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## ON SEPARATORS OF THE SPACE OF NONNEGATIVELY CURVED PLANES

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## ON SEPARATORS OF THE SPACE OF NONNEGATIVELY CURVED PLANES

A. K. AMARASINGHE

**ABSTRACT.** We shall prove that the Hilbert cube cannot be separated by a weakly infinite dimensional subset. As a corollary we obtain that the complement of a weakly infinite dimensional subset of the space of complete nonnegatively curved metrics is continuum connected. We can extend this result to the associated moduli space when the set removed is a Hausdorff space with Haver's property  $\mathcal{C}$ . These results are refinements of theorems proven by Igor Belegardek and Jing Hu [3].

The spaces of Riemannian metrics with positive scalar curvature are subjects of intensive study [10]. The connectedness properties of such spaces on  $\mathbb{R}^2$  were studied recently by Igor Belegardek and Jing Hu [3]. They proved that in the space  $\mathcal{R}_{\geq 0}^k(\mathbb{R}^2)$  of complete Riemannian metrics of nonnegative curvature on the plane equipped with the topology of  $C^k$  uniform convergence on compact sets, the complement  $\mathcal{R}_{\geq 0}^k(\mathbb{R}^2) \setminus X$  is connected for every finite dimensional  $X$ . Note that the space  $\mathcal{R}_{\geq 0}^k(\mathbb{R}^2)$  is separable metric [3]. In this note we extend Belegardek–Hu's result to the case of infinite dimensional spaces  $X$ . We recall that infinite dimensional spaces split in two disjoint classes: strongly infinite dimensional (like the Hilbert cube) and weakly infinite dimensional (like the union  $\cup_n I^n$ ). We prove Belegardek–Hu's theorem for weakly infinite dimensional  $X$ . This extension is final since strongly infinite dimensional spaces can separate the Hilbert cube.

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