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Metrization of function spaces with the Fell topology

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Abstract: For a Tychonoff space X , let $\downarrow C_F(X)$ be the family of hypographs of all continuous maps from X to $[0, 1]$ endowed with the Fell topology. It is proved that X has a dense separable metrizable locally compact open subset if $\downarrow C_F(X)$ is metrizable. Moreover, for a first-countable space X , $\downarrow C_F(X)$ is metrizable if and only if X itself is a locally compact separable metrizable space. There exists a Tychonoff space X such that $\downarrow C_F(X)$ is metrizable but X is not first-countable.

Keywords: space of continuous maps, Fell topology, hyperspace, metrizable, hypograph, separable, first-countable

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