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Smirnov metrization theorem

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The Smirnov metrization theorem establishes necessary and sufficient conditions for a topological space to be metrizable. The theorem reduces questions of metrizability to paracompactness and a local metrizability condition.

Definition: A space X is *locally metrizable* if every point $x \in X$ has a neighborhood that is metrizable in the subspace topology.

Theorem (Smirnov metrization theorem): A space is metrizable if and only if it is paracompact and locally metrizable.