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Topologizing Rings of Map Germs: An Order Theoretic Analysis of Germs via Nonstandard Methods

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(Submitted on 3 Jun 2012)

Using nonstandard analysis we define a topology on the ring of germs of functions: $(\mathbb R^n,0)\rightarrow(\mathbb R,0)$. We prove that this topology is absolutely convex, Hausdorff, that convergent nets of continuous germs have continuous germs as limits and that, for continuous germs, ring operations and compositions are continuous. This topology is not first countable, and, in fact, we prove that no good first countable topology exists. We give a spectrum of standard working descriptions for this topology. Finally, we identify this topological ring as a generalized metric space and examine some consequences.

Subjects:	**General Topology (math.GN)**
MSC classes:	57N17 (primary), 26E35, 06F30, 30G06, 54EXX, 16W80 (secondary)
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