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Non-trivial Automorphism and the Metaphysics of Quantity

The mass of a particular object can be specified numerically, relative to a given mass-measurement scale, but it is difficult to give a clear and uncontroversial account of what, exactly, is attributed to an object by such a specification. J. E. Wolff (2020) argues that a quantity (such as mass) is a homogeneous space consisting of points and relations. On Wolff's view, what it is for an object to have a specific mass is for it to occupy a particular point in mass-space. The homogeneity of quantity spaces accounts for the invariance of their measurement scales under permissible transformations, as identified by the relevant uniqueness theorems in the context of the Representational Theory of Measurement. Because the structure of mass-space is homogeneous, the space has non-trivial automorphisms, and this is claimed to be sufficient as an explanation for why specific masses seem to be non-individual entities, in the sense that a rearrangement of them with respect to the relational structure would not constitute a distinct metaphysical scenario. This explanation, I argue, is unsatisfactory because the notion of a non-trivial automorphism (in the context of a structured set) presupposes that the set elements are individual objects capable of bearing labels.