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# INDISPENSABILITY AND ONTOLOGY

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It is often taken for granted that if it is shown that mathematics is indispensable for our best explanations of natural phenomena, existence claims of applied mathematics thereby acquire a bona fide philosophical justification. Nominalizations have been proposed to substantiate the opposite dispensability claim. Questionable assumptions are at work in the way in which both platonists and nominalists have construed the relation between inferences to the best explanation, ontological commitments and indispensability vs. dispensability claims, assumptions about why we should prefer a certain kind of explanation, either mathematical or not, and why the success of either kind plays the role of a defeater or underminer with respect to our beliefs in whatever plays the (alleged) role of explanans in the rejected explanation.

I look at two nominalistic proposals, by Field (*Field 1980*) and Rizza (*Rizza 2011*). In Field's case, the arithmetic of natural numbers supplemented by set theory is replaced by the logic of identity supplemented by existential numerical quantifiers to derive a conclusion about the existence of a number of concrete objects located in space. In Rizza's case, a number-theoretic lemma about the co-primeness of natural numbers is replaced by a paraphrase resorting to betweenness on temporal intervals to explain the evolutionary advantage of the behavior of cicadas. Building on criticisms offered in *Pataut 2016*, I argue that in each case the nominalistic force of the non mathematical explanation should be assessed in terms of the explanatory role of nominalistically respectable proofs rather than in terms of ontological economy proper.

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