Title: Model constructions for bounded arithmetic
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Abstract: We study constructions of models of bounded arithmetic theories. Using basic techniques of model theory we give a new proof of Ajtai's completeness theorem for nonstandard finite structures. Working in the framework of restricted reduced powers (a generalization of the ultrapower construction) we devise two methods of constructing models of bounded arithmetic. The first one gives a new proof of Buss's witnessing theorem. Using the second method we show that the theory R^1_2 is stronger than its variant $strictR^1_2$ under a plausible computational assumption (the existence of a strong enough one-way permutation), and that the theory $PV_1 + \Sigma^b_1(PV) - \mathrm{LLIND}$ is stronger than $PV_1 + strict\Sigma^b_1(PV) - \mathrm{LLIND}$ under the same assumption. Considering relativized theories, we show that $R^1_2(\alpha)$ is stronger than $strictR^1_2(\alpha)$ (unconditionally).