Continuous approximations in the study of hierarchies

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Abstract

Large organizations are typically modeled as hierarchies. Hierarchies are discrete structures (trees), but researchers frequently use continuous approximations. The purpose of this paper is to study the validity of these approximations. I show that modeling hierarchies with a continuum of tiers is not a good approximation. I also show, for a particular model of balanced hierarchies, that ignoring rounding operators and integer constraints in formulae derived from the discrete model can be a valid approximation, when hierarchies are suitably large. This is made precise by bounds on the relative errors of the approximations.

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