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Pattern formation with proportionate growth[1]

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It is a common observation that as baby animals grow, different body parts grow approximately at same rate. This property, called proportionate growth is remarkable in that it is not encountered easily outside biology. The models of growth that have been studied in Physics so far, e.g diffusion -limited aggregation, surface deposition, growth of crystals from melt etc. involve only growth at the surface, with the inner structure remaining frozen. Interestingly, patterns formed in growing sandpiles provide a very wide variety of patterns that show proportionate growth. One finds patterns with different features, with sharply defined boundaries. In particular, even with very simple rules, one can produce patterns that show striking resemblance to those seen in nature. We can characterize the asymptotic pattern exactly in some special cases. I will discuss in particular the patterns grown on noisy backgrounds.

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