



## Laplacian trees - fingered growth in channel geometry

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A variety of natural growth processes, including viscous fingering, electrodeposition, or solidification can be modeled in terms of Laplacian growth. Laplacian growth patterns are formed when the boundary of a domain moves with a velocity proportional to the gradient of a field  $\Psi$ , which satisfies the Laplace equation,  $\nabla^2\Psi = 0$ , outside the domain.

A simple model of Laplacian growth is considered, in which the growth takes place only at the tips of long, thin fingers [1]. The evolution of the fingers is studied by conformal mapping techniques. Analytical and numerical solutions are obtained for different domains and boundary conditions. In particular, a screening process is analyzed, when longer fingers suppress growth of the shorter ones. Possible geophysical applications of the model are discussed, including formation and evolution of the channels in a dissolving rock fracture.

[1] T. Gubiec, P. Szymczak, Fingered growth in channel geometry: A Loewner equation approach, Phys. Rev. E, 77, 041602, 2008