

INVASION PERCOLATION AFTER TWENTY YEARS

Jorge F. Willemsen
University of Miami
Rosenstiel School of Marine and Atmospheric Science

Invasion percolation was introduced as model for the displacement of one fluid by another within a porous medium in the limit that capillary forces dominate the flow dynamics. This was done independently in 1980 by Roland Lenormand, working in France, and a group of researchers at the Schlumberger-Doll Research Center in the US, namely Richard Chandler, Joel Koplik, Kenneth Ierlan, and Jorge Willemsen. Since this time, many researchers have contributed to the development of this subject, within its original context and extending well outside of it by virtue of its being a paradigm for Self Organized Criticality.

According to the Science Citation Index, 150 papers have IP as a keyword since 1994 alone. Journals publishing these papers range from J Phys A and Phys Rev E and B to J Biomech Eng, Water Resources Res, Int J Heat Mass Tran, Cement Concrete Res, J Contam Hydrol, and Transport Porous Media to name few.

The role of IP in a small collection of examples will be discussed in order to illustrate the many uses to which this simple model has been applied, in the hope that it will remain a vital model, especially for those who are unaware of its features.