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Emergence of vascular networks

In this work we are interested in the formation of vascular networks. The generation of vascular networks is a long standing problem which has been the subject of intense research in the past decades. One of the main reason being the wide spread applications that it has in tissue regeneration, wound healing, cancer treatments, among many others. The mechanisms involved in the formations of vascular networks are complex and despite the vast amount of research devoted to it there are still many mechanisms involved which are poorly understood. Our aim is to bring insight into the study of vascular networks by defining heuristic rules, as simple as possible, and to simulate them numerically to test their relevance in the vascularization process. We introduce a hybrid agent-based/continuum model coupling blood flow, oxygen flow, capillary network dynamics and tissues dynamics.