

Emergence of heterogeneity and political organization in information exchange networks

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We present a simple model of the emergence of the division of labor and the development of a system of resource subsidy from an agent-based model of directed resource production with variable degrees of trust between the agents. The model has three distinct phases, corresponding to different forms of societal organization: disconnected (independent agents), homogeneous cooperative (collective state), and inhomogeneous cooperative (collective state with a leader). Our results indicate that such levels of organization arise generically as a collective effect from interacting agent dynamics, and may have applications in a variety of systems including social insects and microbial communities.

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