

DEFINITIONS OF SELF-ORGANIZATION

The following is Table 1 of Anderson, C. 2002. Self-organization in relation to several similar concepts: are the boundaries to self-organization indistinct? *Biological Bulletin* 202: 247–255. [available from www.isye.gatech.edu/~carl/publications.htm]

Table 1: Various definitions of self-organization, arranged chronologically. Self-organization is considered to be:

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1. indicative of a machine that is “determinate and yet able to undergo spontaneous changes of internal organisation” (Ashby, 1947: p. 125)
 2. “a set of dynamical mechanisms whereby structures appear at the global level of a system from interactions among its lower level components” (Nicolis and Prigogine, 1977, cited in Bonabeau *et al.*, 1997)
 3. “associated with the spontaneous emergence of long-range spatial and/or temporal coherence among the variables of the (organized) system” (Nicolis, 1986: p. 7)
 4. “the spontaneous emergence of coherence or structure without externally applied coercion or control” (Ho and Saunders, 1986: p. 233)
 5. ‘a system is self-organizing if it acquires a spatial, temporal or functional structure without specific interference from the outside. By “specific” we mean that the structure or functioning is not impressed on the system, but that the system is acted upon from the outside in a nonspecific fashion’ (Haken, 1988: p. 11)
 6. “the ability of systems comprising many units and subject to constraints, to organize themselves in various spatial, temporal or spatiotemporal activities. These emerging properties are pertinent to the system as a whole and cannot be seen in units which comprise the system” (Babloyantz, 1991: p. ix)
 7. “the creation of macroscopical patterns by the action of forces distributed in a much more homogeneous way than the structures that arise. Hence, this kind of transformation implies a spontaneous breaking of symmetry” (Belousov, 1993)
 8. “the spontaneous emergence of nonequilibrium structural organization on a macroscopic level due to collective interactions between a large number of simple, usually microscopic, objects” (Coveney and Highfield, 1995: p. 432)
 9. “a process where the organization (constraint, redundancy) of a system spontaneously increases, i.e. without this increase being controlled by the environment or an encompassing or otherwise external system” (Heylighen, 1997)
 10. “a process in which pattern at the global level of a system emerges solely from numerous interactions among the lower-level components of the system. Moreover, the rules specifying interactions among the system’s components are executed using only local information, without reference to the global pattern” (Camazine *et al.*, 2001: p. 8)
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