identifying emergence in complex systems

@thejunglejane
if you put 50 ants on a table
if you put 500,000 ants on a table
adding more ants
relatively simple
foraging for food
building nests
raising livestock
waging war
burying their dead
innate immune system

adaptive immune system
take the lower levels for granted
principle of computational irreducibility
the collective is irreducible to the individual
the whole must be greater than the sum of its parts
emergence
disorganized v. organized complexity
Per Bak
Chao Tang
Kurt Wiesenfeld
self-organized criticality
simple
distributed
scalable
spend water to get water
collective regulation
ants are doing TCP
the independent discovery of TCP/IP, by humans
consensus
scale-free correlation
high signal-to-noise ratio
effective perceptive range
seven nearest neighbors
robustness
many evolutionary cycles in many different environments
natural selection for collective behavior
we have many biological analogs of computational problems
ants and congestion control
starlings and consensus
slime mold and network-routing
swarms and distributed search
neuronal spiking and probabilistic inference
fly brains and max independent sets
problem of representation
top-down feedback
simple and abstract
thank you
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