

Abstract Submitted
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Self organization of social hierarchy in competitive societies

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We investigate self organization of social hierarchy in a competitive society where all individuals have rights to participate in fighting. The winning probability of an individual against an opponent depends on the difference of their wealth. We introduce cost to participate in the fighting and show that the emergence of the hierarchical society depends strongly on the ratio of the cost to the reward for the winner. We show numerically and analytically that the phase transition occurs in two steps for most values of the ratio. Furthermore, we determine the phase diagram as a function of the ratio and the probability of participating in fighting. We show that there are four different phases in the parameter space, one egalitarian phase and three distinct hierarchical phases

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