

Abstract Submitted
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Heterogeneity of Human Activity Levels Gives Rise to Power-Law Distribution in Online Social Networks LEV MUCHNIK, The Hebrew University of Jerusalem, SEN PEI, City College of New York, Beihang University, LUCAS PARRA, City College of New York, SAULO REIS, JOSÉ ANDRADE, JR, Universidade Federal do Ceara, SHLOMO HAVLIN, Bar-Ilan University, HERNAN MAKSE, City College of New York — It is well established that the distribution of social ties (degree) of an individual in a social network follows a power-law. How this heavy-tailed distribution arises in practice, however, has not been conclusively demonstrated. Mechanisms of “preferential-attachment” and optimization are often cited as the origin of heavy-tailed degree distributions. Our data indicate that there is a different cause for these phenomena. For different social networks we find an intrinsic relationship degree and activity (number of posts, edits etc): The degree distribution is entirely random except for its mean value which depends deterministically on the volume of the users’ activity. This suggests that heavy-tailed degree distribution is a consequence of the intrinsic activity of users. More importantly, human activity deterministically affects the mean success at establishing links in a social network, and the specific degree of a given user is otherwise random following a “maximum entropy attachment” model.

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