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# A master equation approach to Science and Facebook popularity

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Scientific citations for publications selected with different rules (author, topic, institution, country, journal, etc...) follow several intriguing scaling properties [1,2]. If one considers as basic variable ( $s = x/\underline{x}$ ), the number of citations ( $x$ ) divided by their mean value ( $\underline{x}$ ) and plot  $f(s)$  (with  $f$  the density function) as a function of  $s$ , the data collapses [3]. Interestingly, we do find that the distribution of ‘shares’ for the Facebook posts rescale in the same manner and on the very same curve with scientific citations [4]. These findings suggest that citations are subjected to a similar growth mechanism with Facebook popularity measures, being influenced by a statistically similar social environment and selection mechanism. To further elaborate on this hypothesis a model based on a simple master-equation with growth and reset is considered. Considering a preferential mechanism for the growth process and an exponential growth for the number of publications our model suggests a Tsallis–Pareto distribution for  $f(s)$ , offering an excellent description for the observed scaling statistics.

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