SG Seminar

Rank dynamics

Virtually anything can be and is ranked; people, institutions, countries, words, genes. Rankings reduce complex systems to ordered lists, reflecting the ability of their elements to perform relevant functions, and are being used from socioeconomic policy to knowledge extraction. More than a century of research has found regularities when temporal rank data is aggregated (e.g., Pareto-Zipf-Mandelbrot distributions). Far less is known, however, about how rankings change in time. We explored the dynamics of 30 rankings in natural, social, economic, and infrastructural systems, comprising millions of elements and timescales from minutes to centuries. We found that the flux of new elements determines the stability of a ranking: for high flux only the top of the list is stable, otherwise top and bottom are equally stable. We have shown that two basic mechanisms — displacement and replacement of elements — capture empirical ranking dynamics. The model uncovers two regimes of behavior; fast and large rank changes, or slow diffusion. Our results indicate that the balance between robustness and adaptability in ranked systems might be governed by simple random processes irrespective of system details.

When: Wednesday
13th March 2024
14:00 – 15:00

Where: ETH Zürich
Rämistrasse 101
HG D 5.1

More information available at
https://www.sg.ethz.ch/

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