



Tuesday, April 5th 2022, on line Seminar, [Teams link](#), 15:00 h and Room AP1, DIFC, Viale delle Scienze Ed. 18

A general centrality framework based on node navigability

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Abstract: Centrality metrics are a popular tool in Network Science to identify important nodes within a graph. We introduce the Potential Gain as a centrality measure that unifies many walk-based centrality metrics in graphs and captures the notion of node navigability, interpreted as the property of being reachable from anywhere else (in the graph) through short walks. Two instances of the Potential Gain (called the Geometric and the Exponential Potential Gain) are presented and we describe scalable algorithms for computing them on large graphs. We also give a proof of the relationship between the new measures and established centralities. The geometric potential gain of a node can thus be characterized as the product of its Degree centrality by its Katz centrality scores. At the same time, the exponential potential gain of a node is proved to be the product of Degree centrality by its Communicability index. These formal results connect potential gain to both the “popularity” and “similarity” properties that are captured by the above centralities.