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How to peel the network: an algorithm for weighted triad census

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In Network Analysis, the interaction between three nodes is called a "triad" and represents the minimal group structure that can be observed. According to the presence and the type of the relations between three nodes, sixteen triadic configurations (called the isomorphism classes) are defined and their distribution is denoted as "triad census". This kind of analysis is used in different situations concerning relational data and the conventional approach is well-defined for unweighted networks. As a consequence, the information regarding the weights is not taken into account. To exploit this information in the triad analysis, we propose a new algorithm denoted as "network peeling" to count the different configurations of triads in weighted networks. The algorithm computes the triad census over the network layers generated at each step. The resulting matrix (with dimensions layers x isomorphism classes) can be summarized through a set of descriptive measures representing the weighted triad census. With the aim to highlight the appropriateness of our approach, we consider some real scenarios and a simulation study, comparing weighted and conventional triad censuses.

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