Sixty years of the degree-diameter problem

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Abstract

Sixty years ago, with the publication of papers from Hoffman-Singleton and Elspas, the degree-diameter problem for undirected graphs attracted considerable interest. Since then, there have been periods of intense activity.

In the 80s and 90s, they were centered around LRI in Paris (Delorme, Bermond, Farhi, ..) - with connections to Belgium (Quisquater, Buset, ..) and UPC in Barcelona (Gómez, Fiol, Yebra, ..) and also in New Zealand (Hafner, Dinneen) and Germany (Sampels). All this work has led to lasting collaborations and results. In January 1995 at UPC we established the first online table of the problem, which became a valuable reference in the field.

At the turn of the century, new approaches emerged from US (Exoo) and Oceania (Loz, Siran, Miller, Pineda-Villavicencio, Perez-Roses, ...) that resulted in significant improvements in the table of large degree-diameter graphs (and other tables). A relevant milestone was the review paper by Miller and Siran (2005) and new web tables at `combinatoricswiki.org`. Over the past fifteen years, progress has been limited basically to a few hard-to-find values for small orders. Despite this current slowdown, the evolution of the degree-diameter table has been remarkable and new advances seem possible.

In this presentation, my focus will be on tracing the journey of this table from the initial publications to its current state, highlighting the contributions of various researchers and the advances made along the way.