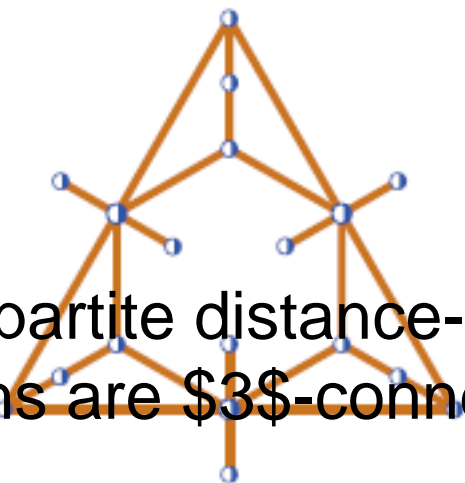


# Bled'11 - 7th Slovenian International Conference on Graph Theory

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## Not all bipartite distance-balanced graphs are 3-connected



### Content :

A connected graph  $G$  is said to be distance-balanced whenever for any pair of adjacent vertices  $u, v$  of

$G$  the number of vertices closer to  $u$  than to  $v$  is equal to the number of vertices closer to  $v$  than to  $u$ .

In [Bipartite graphs with balanced  $(a, b)$ -partitions, (Ars Combin.) 51 (1999), 113--119]

Handa asked whether every bipartite distance-balanced graph that is not a cycle is 3-connected.

In this talk we show that the answer to the Handa question is negative. Moreover, we show that a minimal

bipartite distance-balanced graph that is not a cycle and is not 3-connected has 18 vertices and is unique.

In addition, we give a complete classification of non-3-connected bipartite distance-balanced graphs for which the minimal distance between two vertices in a 2-cut is three. All such graphs are regular and for each  $k \geq 3$  there exists an infinite family of such graphs which are  $k$ -regular.

Joint work with \v Stefko Miklav\v c

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