

Manual for Dubrovnik Graphical Matrices Calculator

Important note: In order that program works correctly one has to set resolution to at least 1280 * 1024

After starting program user inputs graph in several simple steps:

- User inputs number of vertices using list-box. Number of vertices goes from 0 to 8 (of course value 0 is of no interest – graph has to have at least one vertex). Values are changed by arrows to the right of the number. In order that computer accepts changes, user has to click with mouse on selected value. After this input is done, two objects appear:
 - Table for inputting adjacency matrix (at start an empty graph is given)
 - Table for inputting coordinates of vertices (at start vertices are located around the circle)
- User inputs adjacency matrices by pressing the corresponding buttons (each press alternates between values 0 and 1). Computer automatically changes the symmetric value that is associated with the same edge. This algorithm works with trees only, hence user should input graph that is tree
- Using list-boxes user can input the coordinates of vertices. Values are changed by arrows to the right of the number. In order that computer accepts changes, user has to click with mouse on selected value. This will make the color of the font of this value white and its background blue. If this is not done, the change will not be accepted. Both coordinates x and y go from 1 to 20
- User chooses what he wants to do. He can draw one of four graphical matrices: edge-graphical matrix, path-graphical matrix, sparse vertex-graphical matrix and dense vertex-graphical matrix. Also for all these four matrices, four indices can be calculated: Zagreb index, Wiener index, Randic index and Hosoya index.
- Finally, user presses button *Draw* or *Calculate* depending on his previous selections. The algorithm checks if the inputted graph is tree. If not, the message indicating that graph is not a tree is displayed. Otherwise, the required matrix is drawn or required calculation is preformed. In the latter case the algorithm also outputs the sum of all elements in the matrix.
- Also, user may choose to save in the file 16 matrices obtained by application of Zagreb index, Wiener index, Randic and Hosoya index to each of the following graphical matrices: edge-graphical matrix, path-graphical matrix, sparse vertex-graphical matrix and dense vertex-graphical matrix. All six ix matrices will be saved in the format that is used by Mathematica:
 - WIEGM – Wiener index acts on edge-graphical matrix
 - RIEGM – Randic index acts on edge-graphical matrix
 - ZIEGM – Zagreb index acts on edge-graphical matrix
 - HIEGM – Hosoya index acts on edge-graphical matrix

- WIPGM –Wiener index acts on path-graphical matrix
- RIPGM – Randic index acts on path-graphical matrix
- ZIPGM – Zagreb index acts on path-graphical matrix
- HIPGM – Zagreb index acts on path-graphical matrix
- WISVGM –Wiener index acts on sparse vertex-graphical matrix
- RISVGM – Randic index acts on sparse vertex-graphical matrix
- ZISVGM – Zagreb index acts on sparse vertex-graphical matrix
- HISVGM – Zagreb index acts on sparse vertex-graphical matrix
- WIDVGM –Wiener index acts on dense vertex-graphical matrix
- RIDVGM – Randic index acts on dense vertex-graphical matrix
- ZIDVGM – Zagreb index acts on dense vertex-graphical matrix
- HIDVGM – Zagreb index acts on denrse vertex-graphical matrix

User has to input a file to which the data should be saved and then user has to press the button *Write to File*.