

Intensive Computation

16th march 2018

Boolean network tomography

Exercise

- Write the function **FindIdentifiable** that, given a test matrix and a natural k , finds the set of k -identifiable nodes (or write that it is not possible).
- Write the function **MaxIdentifiable** that, given a test matrix, finds the set of k -identifiable nodes **with k max**.

Write a script that:

- Create a network (graph) with n nodes starting from a (sparse) adjacency matrix. Use commands **graph** (applied to the adjacency matrix) and **plot** (applied to the graph) to show the network on a graphical window.
- Select at random a set of monitoring paths and build the test matrix. Show the monitoring paths on the graphical window using different colors.
- Call the function **FindIdentifiable**.
- Call the function **MaxIdentifiable**.
- Write the results obtained from the functions above, as a legend in the graphical window.

Suggestions for drawing the monitoring paths

As specified before, the network can be drawn by using the command **plot** applied to the graph.

To draw the monitoring paths, you need the coordinates of the nodes. You can access the coordinates saving the object created by the command **plot**, and calling the fields **.XData** and **.YData**.

For example you can obtain the arrays of abscissa and ordinates of network nodes by writing:

```
draw=plot(G)
abscissa= draw.XData
ordinate= draw.YData
```

To avoid overlapping monitoring paths to the network (in the figure), consider nodes slightly shifted when drawing the paths.