Markov Zooming Map equation – a detailed example

This example assumes that you have compiled/installed the code correctly as described in the `README` file. To see if the code is working appropriately, open Matlab and switch to the Markov Zooming Map folder as your working directory. Then execute the following commands:

```
% load the provided example graph (a ring of rings) into an adjacency matrix
A = convertPajekToAdjMatrix('ring_of_rings.net');

% assign an output filename
filename = 'test';

% specify a time interval for the analysis
time =logspace(-1,2,100);

% run the actual analysis; note that the time argument is optional, if not
% provided the time interval is set to the one also used in this example
MarkovZoomingMap(A,filename,time)
```

While the code is running you will see some output for each timepoint provided, which looks similar to this one:

```
...
Attempt 99/100
Iteration 1, moving 100 nodes, looping 1 1 1 times between mergings to code length 4.70389 in 5 modules.
Iteration 2, moving 100 nodes, looping 1 times between mergings to code length 4.70389 in 5 modules.
Attempt 100/100
Iteration 1, moving 100 nodes, looping 1 1 1 times between mergings to code length 4.70389 in 5 modules.
Iteration 2, moving 100 nodes, looping 1 times between mergings to code length 4.70389 in 5 modules.
Done! Code length 4.70389 in 5 modules.
```

After the code has finished, a folder `testZoomingMap` should have been created. In this folder you will find two files, a pajek file of the graph and a Matlab file containing the results of the analysis. Load the file and run the script `script_plot_Map_results`. The resulting figure you obtain should look (apart from the inset) like the one below. The dark blue line denotes the number of communities found at a given Markov time, the green line shows the compression gap found (see also reference [1]). The blue cross denotes the number of communities found by the original Map equation. The clustering of the nodes is stored in the variables `clustering` and `clustering_new` for the original and the Markov Zooming Map equation respectively. Likewise the description length and the number of communities found can be found in the variables `L L_new N` and `N_new`.

References

[1] Michael T. Schaub, Renaud Lambiotte, and Mauricio Barahona. "Encoding dynamics for multiscale community detection: Markov time sweeping for the Map equation." *Physical Reviews E*, 2012, 86(2), 026112; see also arXiv:1109.6642.

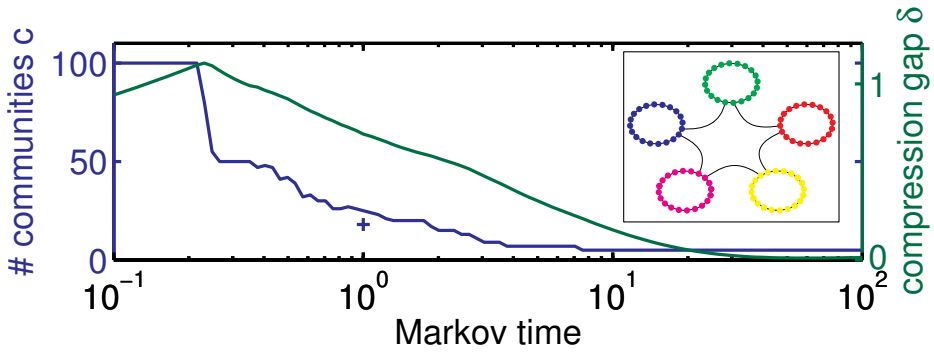

Figure 1: Example analysis ring of rings network. The inset shows the analysed graph.