

# Articulation points in complex networks

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## Package: Greedy Articulation Points Removal Decomposition of Real Networks

Download: [GAPR.zip](#)

Last update: Feb.22 2017

The package contains:

1. GAPR.c

The c code for the GAPR decomposition method

2. edgelist\_example.txt

The edges list file of an example network

How to run:

Compile/link: `gcc -o GAPR GAPR.c`

run: `./GAPR`

Then enter the names of the input file and output files when prompted

Input file:

edgelist of the network with the first row as “#node #edge”, and all the other rows as the “endnode1 endnode2” for each edge.

Note that all the nodes should be continuously labeled with integers from 1 to #node.

For example, see this file: edgelist\_example.txt

Output:

The number of nodes in the Shell#0, which is also the number of nodes outside the GCC in the original network;

The number of APs in each shell;

The size of the RGB;

Output file:

gml file of the network.

The state of each node is labeled with a double-digit number. The first digit represents the shell# the nodes belongs to. The second on indicates if this node is a AP (1) or normal node (0). For example, 21 represents this node is an AP in the shell#2.

The state of each edge is labeled with a single-digit number which represents the shell# it belongs to.

Here is a demo of running GAPR over the input file: edgelist\_example.txt.

```
$. /GAPR
Enter input filename (network edgelist): edgelist_example.txt
Enter output filename (gml file): network_example.gml
The GAPR decomposition starts ...
Shell 0 (nodes outside the GCC in the original network):
Number of nodes in Shell#0: 0
Shell 1:
Number of APs in Shell#1: 5
Shell 2:
Number of APs in Shell#2: 4
Shell 3:
Number of APs in Shell#3: 1
Shell 4:
Number of APs in Shell#4: 0
Size of the RGB: 26
The GAPR decomposition is done!
```