Social Network Analysis Europe Football Games

Data: http://www.football-data.org/

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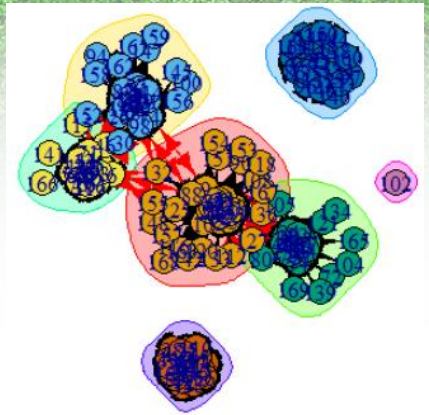
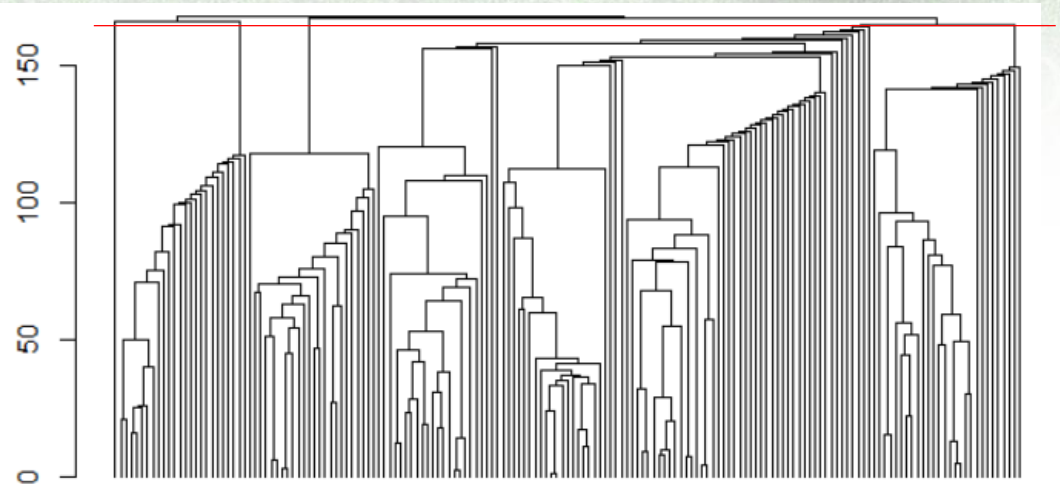
Communities Analysis



color	league
Red	Bundesliga Germany
Green (right)	Second tier Germany
Green (left)	Primer League England
Yellow	La Liga Spain
Blue	Second tier England
Pink	Karlsruher SC
Purple	First tier England



- Walktrap as algorithm
- Divided to 7 communities – just like the different leagues
- By Dendogram - Divided to 4 communities

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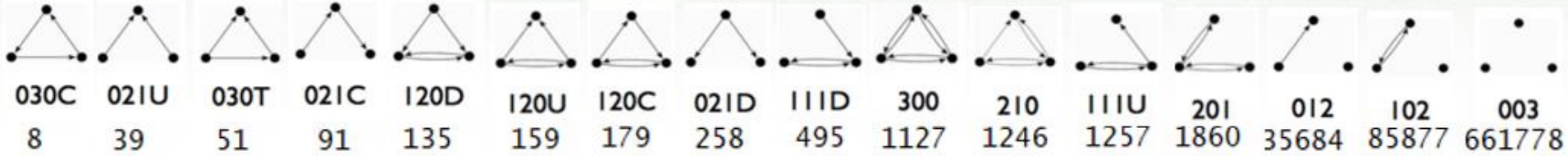
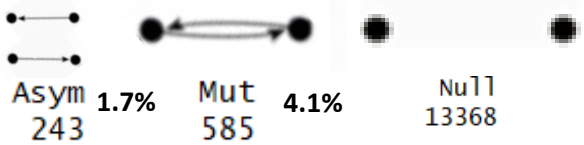
Triad and Dyad Analysis

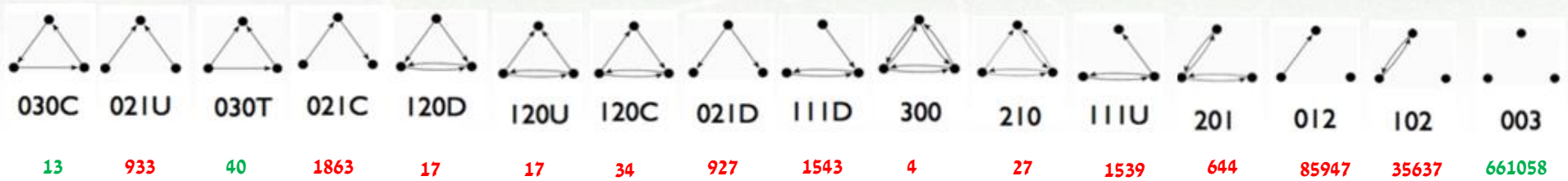
Triad Census:



Dyad Census:



- **Generated 100 networks:**



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Small World Network Analysis

Two Conditions to check: **(I chose only the big component)**

1. $l_{network} \approx \ln(N)$
2. $C_{netwrok} \gg C_{random\ graph}$

	My Network	Random Graph	Check
Condition 1	3.245556	Ln(120)=4.788	V
Condition 2	0.745	0.154	V

A Small World Network

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Free Scale Network Analysis

Degrees Vector:

```
  [1]  0  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2  3  3  3  3
 [42]  3  3  3  3  3  3  3  3  3  3  3  3  3  3  4  4  4  4  4  4  4  4  4  4  4  5  8  9 10 10 11 12 12 12 12 12 13 13 13 13 13
 [83] 13 13 13 14 14 14 15 15 15 15 16 16 16 16 17 17 17 17 18 19 20 22 25 26 27 27 28 28 28 29 29 29 30 30 30 30 30 30 30 30 30
[124] 30 31 31 31 31 31 31 31 32 32 32 32 32 32 32 32 32 33 33 33 33 33 33 33 33 34 34 34 35 36 36 37 37 37 38 38 39 39 39 39 40
[165] 40 40 41 41 43
```

Results:

```
$continuous
[1] FALSE

$alpha
[1] 33.08237

$xmin
[1] 40

$logLik
[1] -7.602404

$KS.stat
[1] 0.07079412

$KS.p
[1] 1
```

- Not a Free-Scale Network
- Behave like Free-Scale Network only from degree 40

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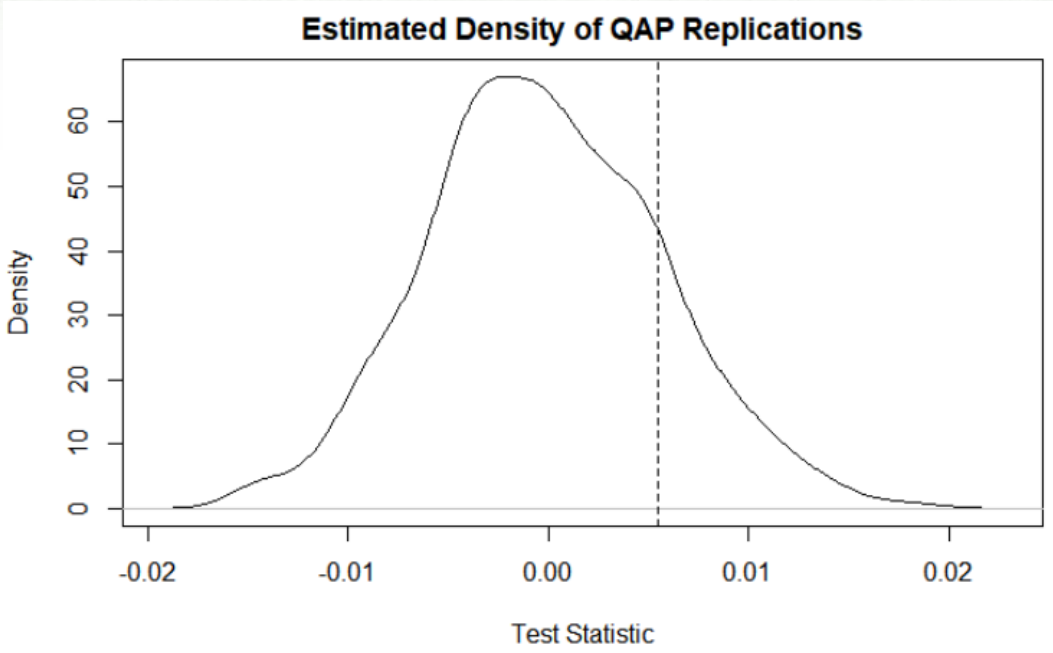
QAP Test

Random network with the same number of nodes and edges




```
[1] 0.005511905
```

```
QAP Test Results

Estimated p-values:
        p(f(perm) >= f(d)): 0.155
        p(f(perm) <= f(d)): 0.846

Test Diagnostics:
        Test Value (f(d)): 0.005511905
        Replications: 1000
        Distribution Summary:
                Min:      -0.01558147
                1stQ:     -0.004090305
                Med:      -0.0004697992
                Mean:     -0.0001911777
                3rdQ:     0.003937773
                Max:      0.01904945
```

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