Social Network Analysis Home Assignment 4

{Your Name}

due date - 12.06.2016 23:59

Contents

Network Epidemics

Please send your reports to hse.ntwks@gmail.com with the subject of of the following structure: *[MAGOLEGO SNA 2017] {LastName} {First Name} HW{Number}*

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Use this file as a template for your report.
Support your computations with figures and comments. Send ONLY .Rmd versions of your report.

```
##
## Attaching package: 'igraph'

## The following objects are masked from 'package:stats':
##
##     decompose, spectrum

## The following object is masked from 'package:base':
##
##     union
```

SIR Model

You need to perform epidemic SIR model on different types of networks: Try different parameters for network generation

```
gl <- list()
gl$ba <- barabasi.game(n = 100,m = 12 , directed=FALSE)
gl$er <- erdos.renyi.game(n = 250, p.or.m = 0.02, type=c("gnp"))
gl$ws <- watts.strogatz.game(dim = 1, size = 1000, nei = 3, p = 0.01)
```

Moreover perform modeling on real peer-to-peer network here

Your goal is to perform a research on epidemics: Use different values of parameters listed below

```
beta <- 2
gamma <- 4
ntrials <- 100

# Running function sir for each element of list gl (list with graphs)
sim <- lapply(gl, sir, beta=beta, gamma=gamma, no.sim=ntrials)
```
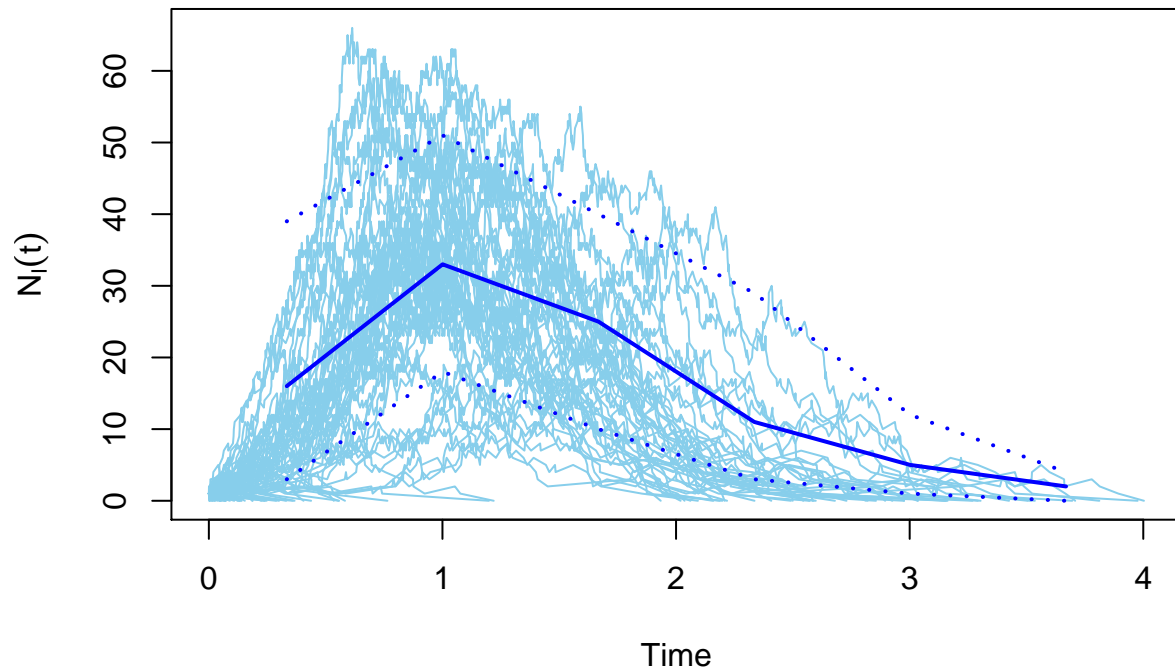
at least 3 different versions, for example:

- betta (4 6 8)
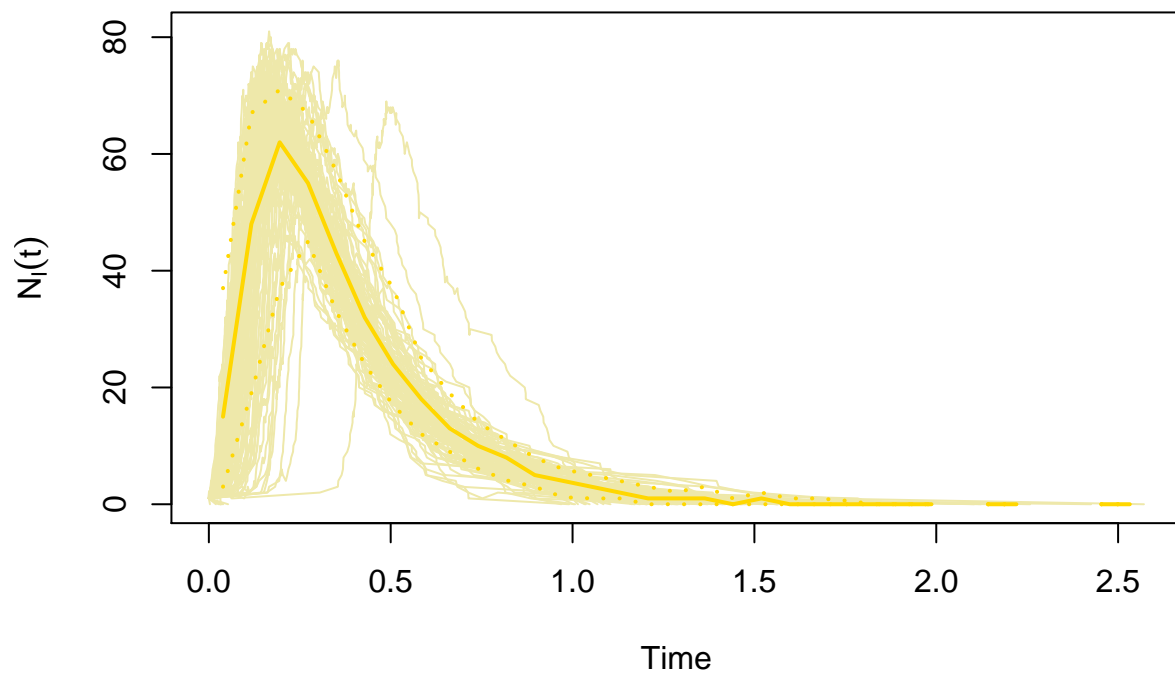- gamma (8 6 2)
- niter (100 500 1000)

For some reason `beta` *and* `gamma` *parameters should not be set below 0 and 1. Looks like they are somehow normilized during simulation.*

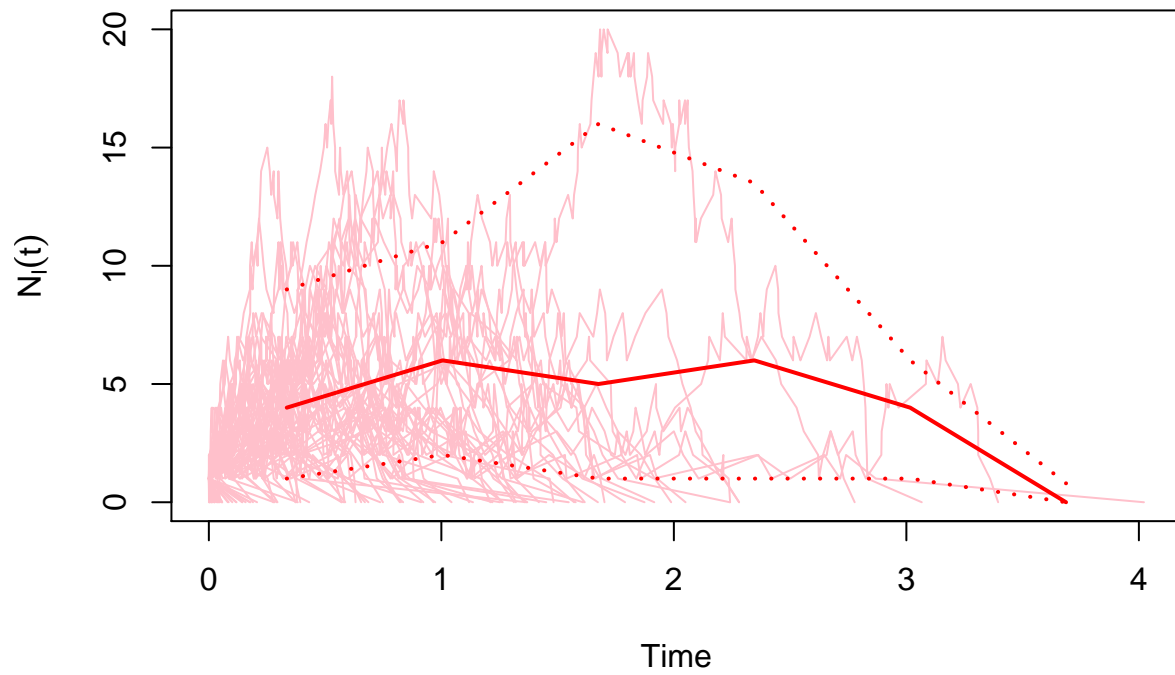The code below can help you with plotting

```
plot(sim$er)
```



```
plot(sim$ba, color="palegoldenrod", median_color="gold", quantile_color="gold")
```

```r
plot(sim$ws, color="pink", median_color="red", quantile_color="red")
```

```
x.max <- max(sapply(sapply(sim, time_bins), max))
y.max <- 1.05 * max(sapply(sapply(sim, function(x) median(x)[["NI"]]), max, na.rm=TRUE))

plot(time_bins(sim$er), median(sim$er)[["NI"]], type="l", lwd=2, col="blue", xlim=c(0, x.max), ylim=c(0
lines(time_bins(sim$ba), median(sim$ba)[["NI"]], lwd=2, col="gold")
lines(time_bins(sim$ws), median(sim$ws)[["NI"]],lwd=2, col="red")
legend("topright", c("ER", "BA", "WS"),col=c("blue", "gold", "red"), lty=1)
```
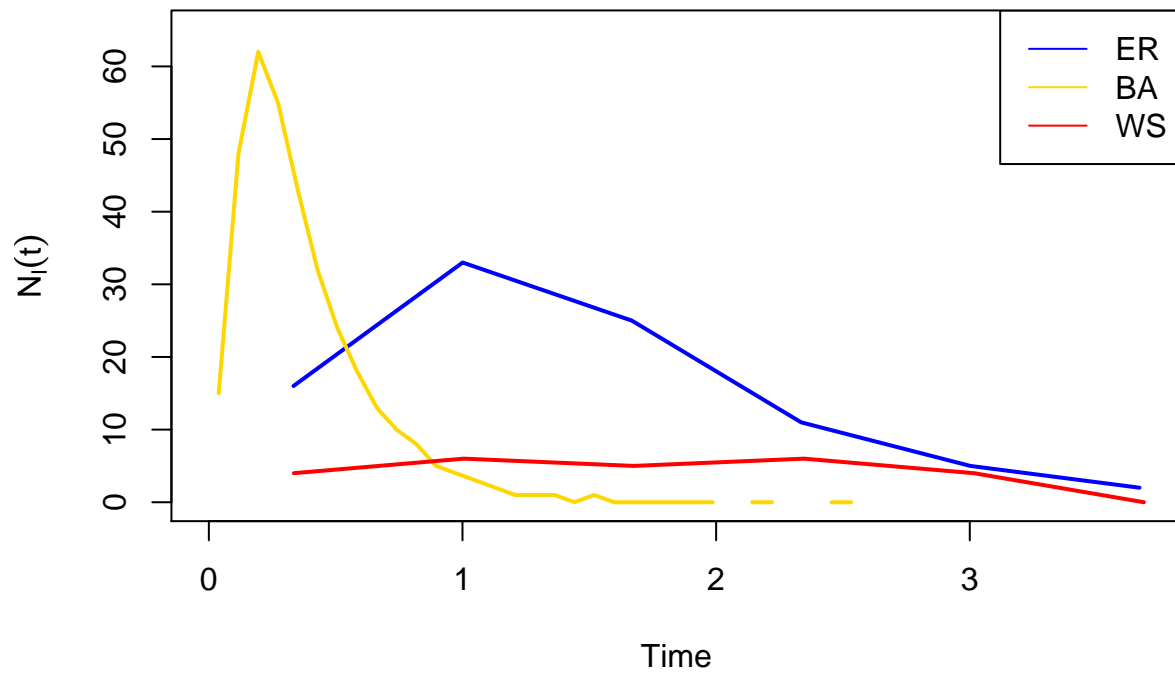
You need to plot three values on the graphics: Number of infected, number of suseprible, number of recovered - all depends on time. As a result of this task, you need to provide 12 plots (one for each network with 3 diferent parameters) with explanation.