Resumen de las propiedades de las redes

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Propiedades generales

Membership

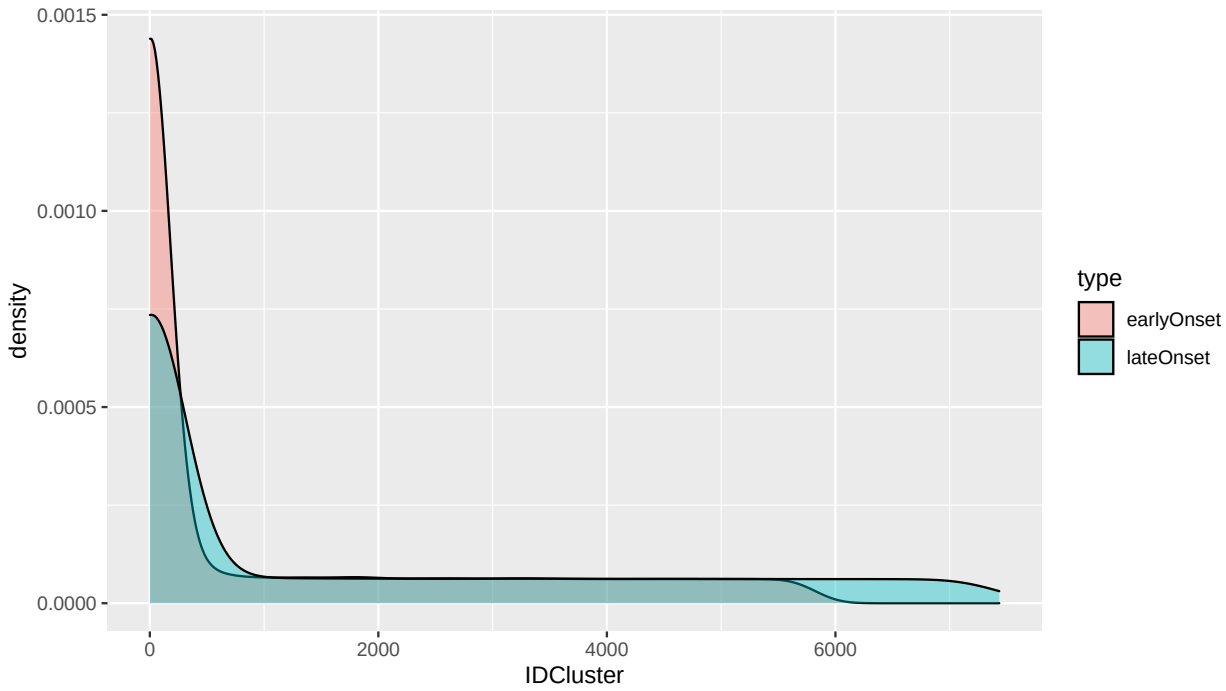
```
# Inicio temprano
summary(prop_graphs[[1]]$components$membership)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##       1       1       1    1065    1814    5824
```

```
# Inicio tardio
summary(prop_graphs[[2]]$components$membership)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##       1       1       1    1710    3380    7434
```

```
ggplot(data = data.frame(IDCluster = c(prop_graphs[[1]]$components$membership,
                                       prop_graphs[[2]]$components$membership),
                         type = rep(c("earlyOnset", "lateOnset"), each = 16319)),
       mapping = aes(x= IDCluster, fill = type)) + geom_density(alpha = 0.4)
```



```
#plot(density(prop_graphs[[1]]$components$membership), xlab = "ID del cluster")
#lines(density(prop_graphs[[2]]$components$membership))
```

Número de Clusters

```
kable(data.frame(earlyOnset = prop_graphs[[1]]$components$no,
                 lateOnset = prop_graphs[[2]]$components$no))
```

earlyOnset	lateOnset
5824	7434

Tamaño de los clusters

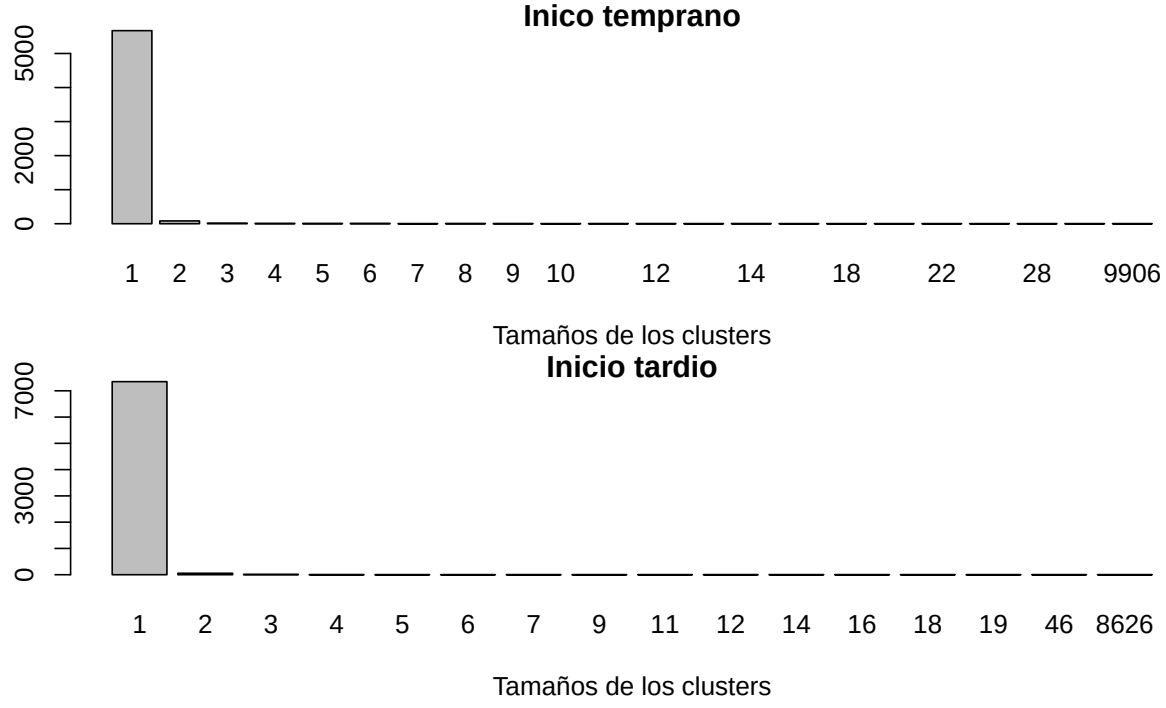
```
# Inicio temprano
summary(prop_graphs[[1]]$components$csize)
```

```
##     Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
##    1.000    1.000    1.000    2.802    1.000 9906.000
```

```
# Inicio tardio
summary(prop_graphs[[2]]$components$csize)
```

```
##     Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
##    1.000    1.000    1.000    2.195    1.000 8626.000
```

```
par(mfrow = c(2,1), mar = c(4, 3, 1, 1))
barplot(table(prop_graphs[[1]]$components$csize), xlab = "Tamaños de los clusters",
        main = "Inico temprano")
barplot(table(prop_graphs[[2]]$components$csize), xlab = "Tamaños de los clusters",
        main = "Inicio tardio")
```



Rutas más cortas entre nodos

```
kable(data.frame(earlyOnset = prop_graphs[[1]]$average.path.length,
                 lateOnset = prop_graphs[[2]]$average.path.length))
```

earlyOnset	lateOnset
4.105982	3.030173

Transitividad

```
kable(data.frame(earlyOnset = prop_graphs[[1]]$transitivity,
                 lateOnset = prop_graphs[[2]]$transitivity))
```

earlyOnset	lateOnset
0.5300775	0.5395471

Diametro

```
kable(data.frame(earlyOnset = prop_graphs[[1]]$diameter,
                 lateOnset = prop_graphs[[2]]$diameter))
```

earlyOnset	lateOnset
24	12

Propiedades de los nodos

Degree

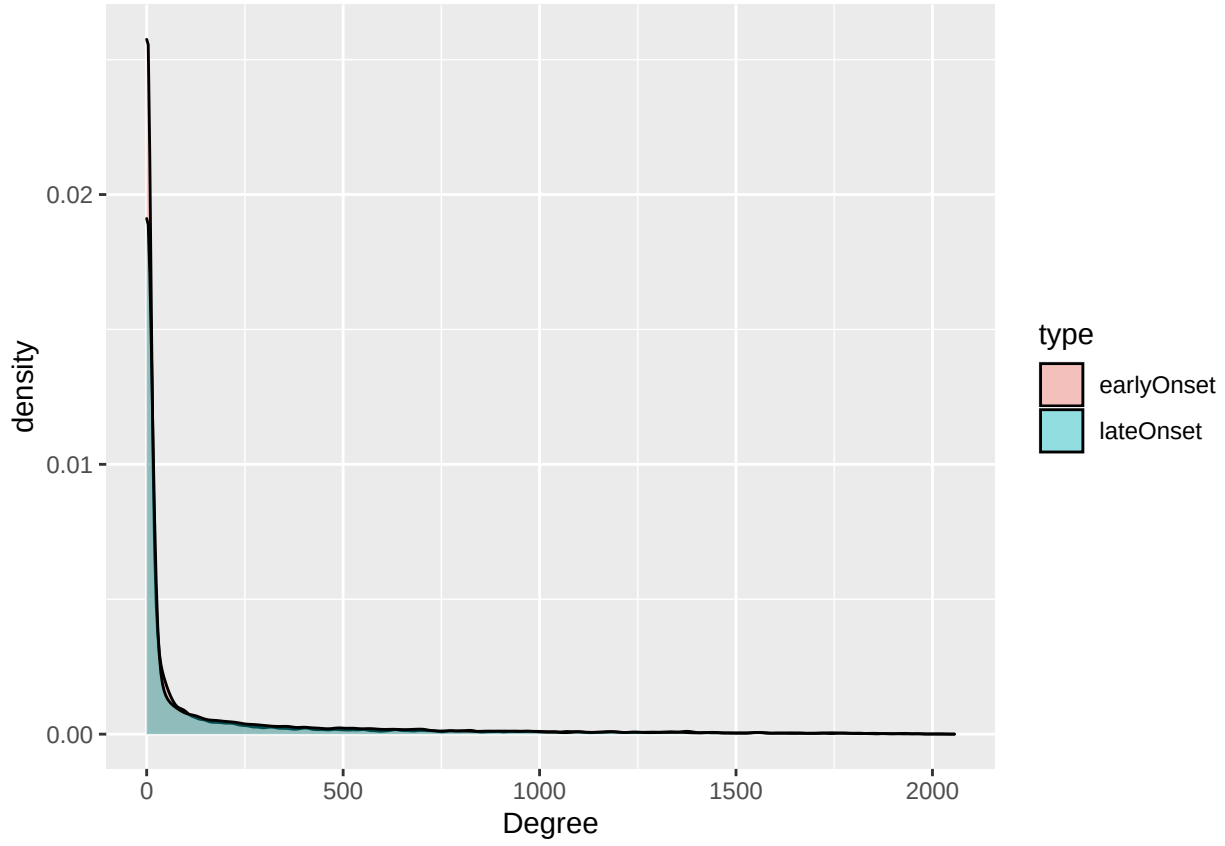
```
# Inicio temprano
summary(prop_graphs[[1]]$nodes$degree)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##       0       0       5     156      87    2056
```

```
# Inicio tardio
summary(prop_graphs[[2]]$nodes$degree)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##     0.0     0.0     2.0   163.2   127.0  1992.0
```

```
ggplot(data = data.frame(Degree = c(prop_graphs[[1]]$nodes$degree,
                                    prop_graphs[[2]]$nodes$degree),
                         type = rep(c("earlyOnset", "lateOnset"), each = 16319)),
       mapping = aes(x= Degree, fill = type)) + geom_density(alpha = 0.4)
```



Betweeneess

```
# Inicio temprano
summary(prop_graphs[[1]]$nodes$betweenness)
```

```
##      Min.   1st Qu.    Median      Mean   3rd Qu.      Max.
##       0.0       0.0       2.5    9338.2    7068.5 1881872.0
```

```
# Inicio tardio
summary(prop_graphs[[2]]$nodes$betweenness)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##       0       0       0    4628    1539  228317
```

Transitividad

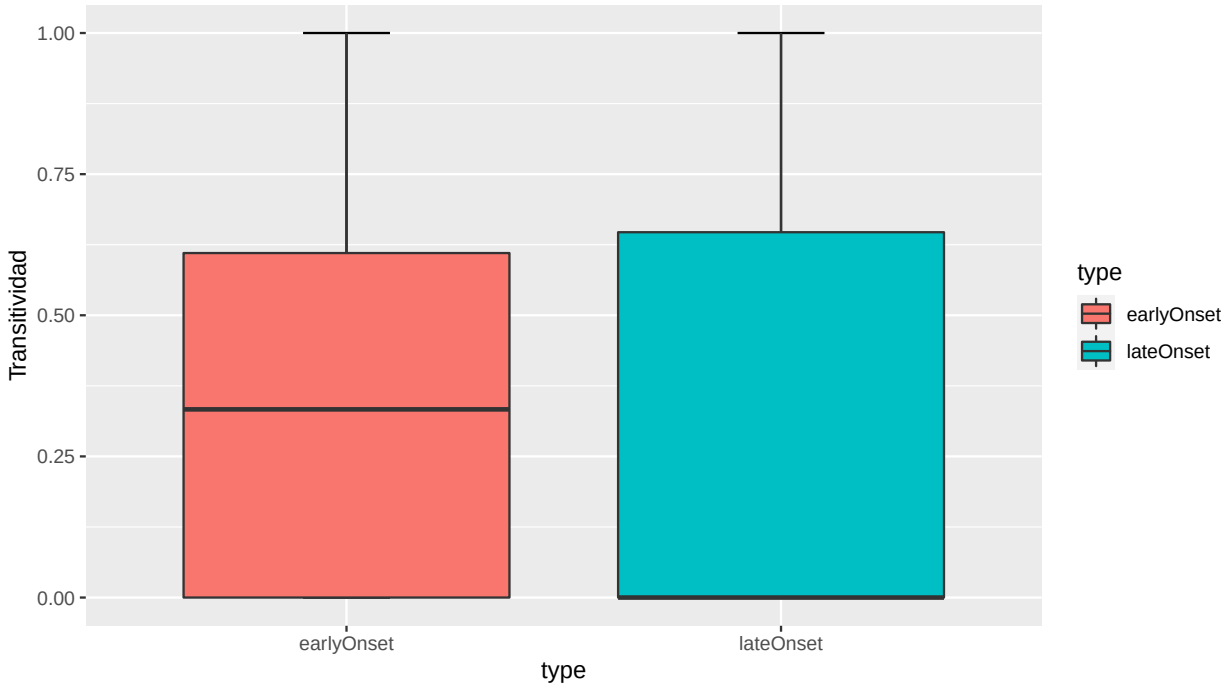
```
# Inicio temprano
summary(prop_graphs[[1]]$nodes$transitivity)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##  0.0000  0.0000  0.3333  0.3347  0.6102  1.0000
```

```
# Inicio tardio
summary(prop_graphs[[2]]$nodes$transitivity)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##  0.0000  0.0000  0.0000  0.3296  0.6471  1.0000
```

```
ggplot(data = data.frame(transitivity = c(prop_graphs[[1]]$nodes$transitivity,
                                          prop_graphs[[2]]$nodes$transitivity),
                         type = rep(c("earlyOnset", "lateOnset"), each = 16319)),
       mapping = aes(x= type,  y = transitivity, fill = type)) +
  scale_y_continuous(name = "Transitividad") +
  stat_boxplot(geom = "errorbar", width = 0.2) + geom_boxplot()
```



Clustering Louvain

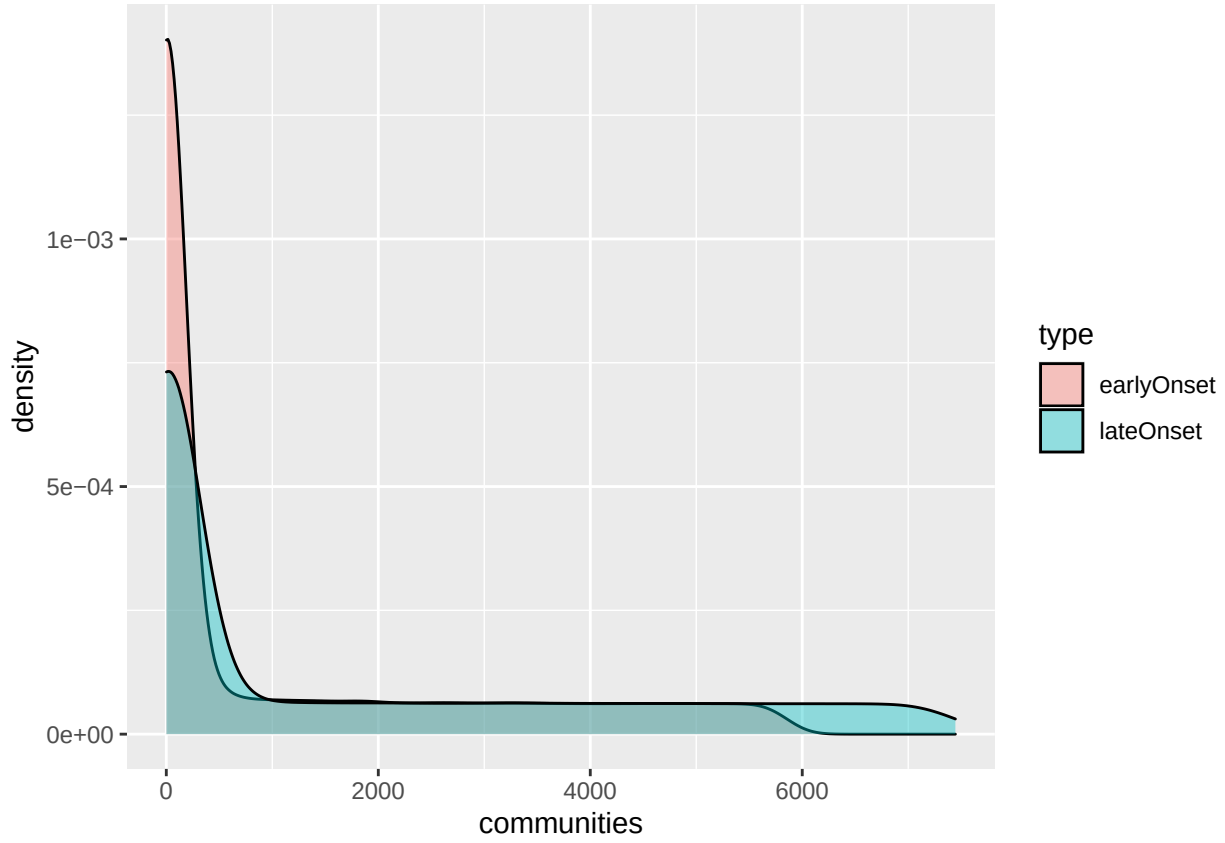
```
# Inicio temprano
summary(prop_graphs[[1]]$nodes$comm.louvain)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##       1       2      10    1083    1848    5854
```

```
# Inicio tardio
summary(prop_graphs[[2]]$nodes$comm.louvain)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##       1       2      23    1720    3392    7445
```

```
ggplot(data = data.frame(communities = c(prop_graphs[[1]]$nodes$comm.louvain,
                                         prop_graphs[[2]]$nodes$comm.louvain),
                         type = rep(c("earlyOnset", "lateOnset"), each = 16319)),
       mapping = aes(x= communities, fill = type)) + geom_density(alpha = 0.4)
```



Propiedades de los edges

```
# Inicio temprano
summary(prop_graphs[[1]]$edges$betweenness)
```

```
##      Min.   1st Qu.    Median      Mean   3rd Qu.      Max.
##       1.0      14.3      29.4     158.3      72.9 1696046.0
```

```
# Inicio tardio
summary(prop_graphs[[2]]$edges$betweenness)
```

```
##     Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
##     1.00    11.16    23.53    84.68    58.37 68998.81
```

Exploración de algunos genes

Valores membership de los genes pertenecientes a clusters con el mayor tamaño

```
prop_graphs$earlyOnset$components$membership[prop_graphs$earlyOnset$components$csize  == 11738]
```

```
## named numeric(0)
```

Valores membership de genes pertenencientes a clusters de un tamaño mayor a 50

```
prop_graphs$earlyOnset$components$membership[prop_graphs$earlyOnset$components$csize  > 50 ]
```

```
##        RAB4B         DDI2 LOC105370027
##            1         2107         4170
```

Gen con el mayor degree

```
prop_graphs$earlyOnset$nodes[c(1, 2)] %>% filter(degree ==2435)
```

```
## [1] name   degree
## <0 rows> (or 0-length row.names)
```

Genes con niveles altos de degree

```
prop_graphs$earlyOnset$nodes[c(1, 2)] %>% filter(degree >= 2300)
```

```
## [1] name   degree
## <0 rows> (or 0-length row.names)
```