Make Reduced From Partition

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Setup for the new function `make_reduced_from_partition`

Load all libraries and load the new function

```
library(concorR)
library(igraph)
```

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

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

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

```
source('mrfp.R')
```

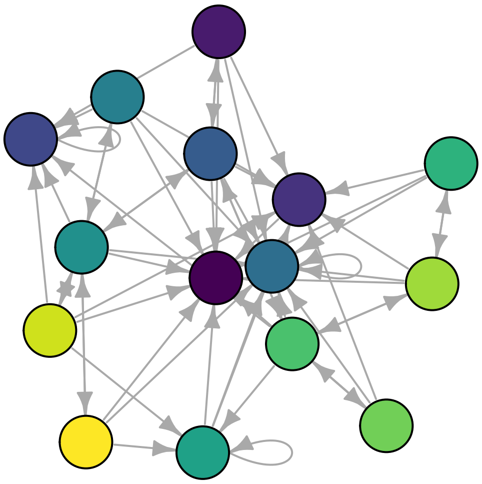
Proof of concept

I messed with `edge_betweenness` to find communities in the examples in the standard README for `concorR`. They were not instructive (only one community), so I abandoned that. Instead, I have created a random network and found communities there:

```
set.seed(1234)
g  <-  erdos.renyi.game(50,p=0.2)
g_adj  <- as.matrix(as_adjacency_matrix(g))
ebc.g  <- edge.betweenness.community(g)
ebPart  <- list(ebc.g$membership)
```

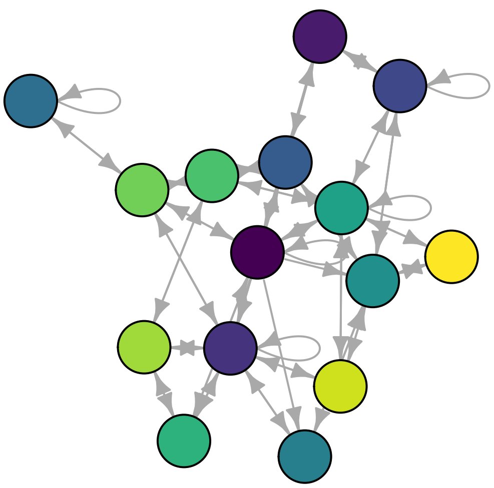
First, let's show that the reduced network works for the degree statistic:

```
g.red  <- make_reduced_from_partition(list(g_adj), ebPart, stat='degree')
plot_reduced(make_reduced_igraph(g.red$reduced_mat[[1]]))
```



And now, the density statistic:

```
g.red.den  <- make_reduced_from_partition(list(g_adj), ebPart, stat='density')
plot_reduced(make_reduced_igraph(g.red.den$reduced_mat[[1]]))
```



Full function text

```
make_reduced_from_partition
```

```
## function (adj_list, partition_list, stat = "density")
## {
##     if (stat == "density") {
##         dens_vec <- sapply(adj_list, function(x) .edge_dens(x))
##         mat_return <- vector("list", length = length(dens_vec))
##         for (i in 1:length(dens_vec)) {
##             this_adj_mat = adj_list[[i]]
##             thisBlk = partition_list[[i]]
##             nb = max(thisBlk)
##             reduced_den = matrix(0, nrow = nb, ncol = nb)
##             rownames(reduced_den) = paste("Block", 1:nb)
##             colnames(reduced_den) = paste("Block", 1:nb)
##             for (j in 1:nb) {
##                 nRows = sum(j == thisBlk)
```

```
##                 for (k in 1:nb) {
##                   nCols = sum(k == thisBlk)
##                   if (nRows == 1) {
##                     if (nCols == 1) {
##                       blk_adj_mat = this_adj_mat[j == thisBlk,
##                         k == thisBlk]
##                       d = ifelse(blk_adj_mat > 0, 1, 0)
##                     }
##                     else {
##                       blk_adj_mat = this_adj_mat[j == thisBlk,
##                         k == thisBlk]
##                       blk_adj_mat = matrix(blk_adj_mat, nrow = 1)
##                       d = .block_edge_dens(blk_adj_mat)
##                     }
##                   }
##                   else {
##                     if (nCols == 1) {
##                       blk_adj_mat = this_adj_mat[j == thisBlk,
##                         k == thisBlk]
##                       blk_adj_mat = matrix(blk_adj_mat, ncol = 1)
##                     }
##                     else {
##                       blk_adj_mat = this_adj_mat[j == thisBlk,
##                         k == thisBlk]
##                     }
##                     d = ifelse(i == j, .edge_dens(blk_adj_mat),
##                       .block_edge_dens(blk_adj_mat))
##                   }
##                   reduced_den[j, k] = d
##                 }
##             }
##             temp1 <- reduced_den
##             temp1[is.nan(temp1)] <- 0
##             temp1[temp1 < dens_vec[[i]]] <- 0
##             temp1[temp1 > 0] <- 1
##             mat_return[[i]] <- temp1
##         }
##         return_list <- list()
##         return_list$reduced_mat <- mat_return
##         return_list$dens <- dens_vec
##         return(return_list)
##     }
##     else if (stat == "degree") {
##         outdegree = lapply(adj_list, function(x) .scaledDegree(x))
##         mat_return <- vector("list", length = length(outdegree))
##         for (i in 1:length(outdegree)) {
##             this_adj_mat = adj_list[[i]]
##             thisBlk = partition_list[[i]]
##             nb = max(thisBlk)
##             reduced_degree = matrix(0, nrow = nb, ncol = nb)
##             rownames(reduced_degree) = paste("Block", 1:nb)
##             colnames(reduced_degree) = paste("Block", 1:nb)
##             for (j in 1:nb) {
##                 nRows = sum(j == thisBlk)
```

```
##                  for (k in 1:nb) {
##                    nCols = sum(k == thisBlk)
##                    if (nRows == 1) {
##                      if (nCols == 1) {
##                        blk_adj_mat = this_adj_mat[j == thisBlk,
##                          k == thisBlk]
##                        outDeg = ifelse(blk_adj_mat > 0, 1, 0)
##                      }
##                      else {
##                        blk_adj_mat = this_adj_mat[j == thisBlk,
##                          k == thisBlk]
##                        blk_adj_mat = matrix(blk_adj_mat, nrow = 1)
##                        outDeg = .scaledDegree(blk_adj_mat)
##                      }
##                    }
##                    else {
##                      if (nCols == 1) {
##                        blk_adj_mat = this_adj_mat[j == thisBlk,
##                          k == thisBlk]
##                        blk_adj_mat = matrix(blk_adj_mat, ncol = 1)
##                      }
##                      else {
##                        blk_adj_mat = this_adj_mat[j == thisBlk,
##                          k == thisBlk]
##                      }
##                      outDeg = .scaledDegree(blk_adj_mat)
##                    }
##                    reduced_degree[j, k] = outDeg
##                  }
##              }
##              temp1 <- reduced_degree
##              temp1[is.nan(temp1)] <- 0
##              temp1[temp1 < outdegree[[i]]] <- 0
##              temp1[temp1 > 0] <- 1
##              mat_return[[i]] <- temp1
##          }
##          return_list <- list()
##          return_list$reduced_mat <- mat_return
##          return_list$deg <- outdegree
##          return(return_list)
##      }
##      else {
##          stop("Statistics implemented for determining edges in reduced networks are only \n         de
##      }
## }
## <bytecode: 0x55d992ba4130>
```