# Description of edges with infinitesimal small epsilon weights

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November 15, 2010

Work in progress! Not yet finished!

## 1 Introduction

Algorithm of Bretz et al. [1] for rejecting a node:

$$\alpha_l <- \begin{cases} \alpha_l + a_j g_{jl} & l \in I \\ 0 & \text{otherwise} \end{cases}$$

$$g_{lk} <- \begin{cases} \frac{g_{lk}+g_{lj}g_{jk}}{1-g_{lj}g_{jl}} & k, l \in I, l \neq k, g_{lj}g_{jl} < 1 \\ 0 & \text{otherwise} \end{cases}$$

We want now investigate what happens if a edge weight $\epsilon > 0$ approaches 0. In respect to

$$\alpha_l <- \begin{cases} 0 = \lim_{g_{jl} \to 0} (\alpha_l + a_j g_{jl}) & l \in I \\ 0 & \text{otherwise} \end{cases}$$

The only question is, what happens if and $l \in I, l \neq k, g_{lj}g_{jl} < 1$. If $g_{lj}g_{jl} == 1$ still $g_{lk} < -0$.

$$\lim_{g_{jl} \to 0} \left( \frac{g_{lk} + g_{lj}g_{jk}}{1 - g_{lj}g_{jl}} \right) = \begin{cases} \frac{g_{lk}+g_{lj}g_{jk}}{1-g_{lj}g_{jl}} & g_{lj}g_{jl} < 1 \\ 0 & g_{lj}g_{jl} = 1 \\ a & \\ b & \end{cases} =$$

```
> hnodes <- c("H11", "H21", "H31", "H12", "H22", "H32")
> alpha <- c(0.05/3, 0.05/3, 0.05/3, 0, 0, 0)
> edges <- list()
> edges[["H11"]] <- list(edges = c("H21", "H12"), weights = c(1/2, 1/2))
> edges[["H21"]] <- list(edges = c("H11", "H31", "H22"), weights = c(1/3, 1/3, 1/3))
> edges[["H31"]] <- list(edges = c("H21", "H32"), weights = c(1/2, 1/2))
> edges[["H12"]] <- list(edges = "H21", weights = 1)
> edges[["H22"]] <- list(edges = c("H11", "H31"), weights = c(1/2, 1/2))
> edges[["H32"]] <- list(edges = "H21", weights = 1)
> graph <- new("graphMCP", nodes = hnodes, edgeL = edges, alpha = alpha)
```

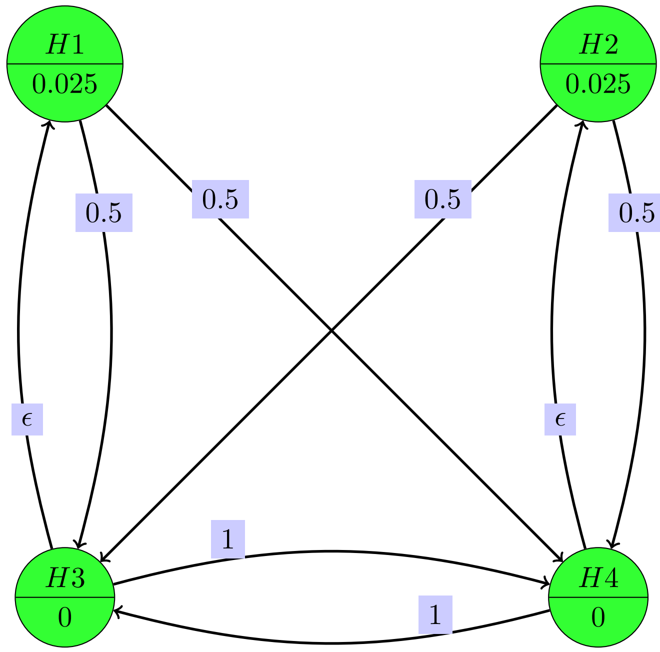


Figure 1: Graph for improved parallel gatekeeping.

## References

[1] F.˜Bretz, W.˜Maurer, and G.˜Hommel. Test and power considerations for multiple endpoint analyses using sequentially rejective graphical procedures. *Statistics in medicine*, 2010 (in press).