Coding Part

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```
Y1 = c(2,1,4,5,3,4,4,5,8,8,9,12,14,14,15)
Y2 = c(0,1,0,0,3,2,3,4,2,5,6,6,4,6,7)

Poisson.ratio.exactCI <- function(Y1, Y2, searchlist, nsamples, alpha, interval=FALSE){
    n = length(Y1)
    results = c()
    if(!interval){
        for( beta in searchlist ){
            flag = 1
            for( i in 1:n ){
               samples = rbinom(nsamples, Y1[i]+Y2[i], beta/(1+beta))
               inf = quantile(samples, (1-alpha)/2)
               sup = quantile(samples, (1+alpha)/2)
               if(Y1[i] < inf || Y1[i] > sup){
                   flag = 0
                   break
               }
            }
            if(flag){
                results = c(results, beta)
            }
        }
    }
    else{
        for( beta in searchlist ){
            flag = 1
            for( i in 1:n ){
               samples = rbinom(nsamples, Y1[i]+Y2[i], beta/(1+beta))
               inf = quantile(samples, (1-alpha)/2)
               sup = quantile(samples, (1+alpha)/2)
               if(Y1[i] < inf || Y1[i] > sup){
                   flag = 0
                   break
               }
            }
            if(flag){
                results = c(results, beta)
                break
            }
        }
        for( beta in rev(searchlist) ){
            flag = 1
            for( i in 1:n ){
               samples = rbinom(nsamples, Y1[i]+Y2[i], beta/(1+beta))
               inf = quantile(samples, (1-alpha)/2)
               sup = quantile(samples, (1+alpha)/2)
               if(Y1[i] < inf || Y1[i] > sup){
```

```
                    flag = 0
                    break
                }
            }
            if(flag){
                results = c(results, beta)
                break
            }
        }
    }
    results
}

betas = Poisson.ratio.exactCI(Y1, Y2, seq(0, 10, by=1), 10000, 0.95)
betas
```

```
## [1] 2 3 4 5
```

```
betas = Poisson.ratio.exactCI(Y1, Y2, seq(1, 6, by=0.1), 100000, 0.95)
betas
```

```
##  [1] 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3 2.4 2.5 2.6 2.7 2.8
## [18] 2.9 3.0 3.1 3.2 3.3 3.4 3.5 3.6 3.7 3.8 3.9 4.0 4.1 4.2 4.3 4.4 4.5
## [35] 4.6 4.7 4.8 4.9 5.0 5.1
```

```
betas = Poisson.ratio.exactCI(Y1, Y2, seq(1.0, 5.2, by=0.01), 1000000, 0.95, interval=TRUE)
betas
```

```
## [1] 1.10 5.12
```