

# 第一次作业

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```
# 圆桌夫妇座位问题
is.couple<-function(i,j){
  # (1,2)(3,4) 是对的, (2,3)(4,5) 是不对的
  abs(i-j)==1 & (i+j)%4==3
}

library(e1071)

couples_around_table<- function(N){#N 对夫妇, 暴力验证
  permutations=permutations(2*N)
  count=0
  total=nrow(permutations)
  for (i in 1:total){
    P=permutations[i,]
    for (j in 1:(2*N)){
      if (is.couple(P[j],P[j%(2*N)+1])){
        count=count+1
        break}
    }
  }
  1-count/total
}

theory<-function(N){
  # 理论公式
  sum=1
```

```

for (i in 1:N){
  sum<-sum+(-1)^{i}*choose(N,i)*2^{i}*factorial(2*N-i-1)/factorial(2*N-1)
}
sum
}

```

```
couples_around_table(2);theory(2)
```

```
## [1] 0.3333333
```

```
## [1] 0.3333333
```

```
couples_around_table(3);theory(3)
```

```
## [1] 0.2666667
```

```
## [1] 0.2666667
```

```
couples_around_table(4);theory(4)
```

```
## [1] 0.2952381
```

```
## [1] 0.2952381
```