

ACADGILD ASSIGNMENT - 3.2

1. Create an $m \times n$ matrix with `replicate(m, rnorm(n))` with $m=10$ column vectors of $n=10$ elements each, constructed with `rnorm(n)`, which creates random normal numbers.

- Then we transform it into a dataframe (thus 10 observations of 10 variables) and perform an algebraic operation on each element using a nested for loop: at each iteration, every element referred by the two indexes is incremented by a sinusoidal function, compare the vectorized and non-vectorized form of creating the solution and report the system time differences.

ANSWER:

```
#Vectorized form
set.seed(42)

#create matrix
mat_1<- replicate(10,rnorm(10))

#transform into data frame
df_1= data.frame(mat_1)
df_1<- df_1 + 10*sin(0.75*pi)

#non-vectorized form
set.seed(42)

#create matrix
mat_1<- replicate(10,rnorm(10))

#transform into data frame
df_1= data.frame(mat_1)

for(i in 1:10){
  for(j in 1:10){
    df_1[i,j]<- df_1[i,j] + 10*sin(0.75*pi)
  }
  print(df_1)
}

#time difference
```

```
system.time(  
df_1[i,j]<- df_1[i,j] + 10*sin(0.75*pi)  
)
```

```
system.time(  
for(i in 1:10){  
  for(j in 1:10){  
    df_1[i,j]<- df_1[i,j] + 10*sin(0.75*pi)  
  }  
}  
)
```