Data605_Discussion10

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11.1 Ex. 13

13 Write a program to compute u(n) given u and P. Use this program to compute u(10) for the Land of Oz example, with u = (0, 1, 0), and with u = (1/3, 1/3, 1/3).

```
P <- matrix(c(.50, .25, .25, .50, 0, .50, .25, .25, .50), ncol=3,nrow=3, byrow = TRUE)
P
```

```
##      [,1] [,2] [,3]
## [1,] 0.50 0.25 0.25
## [2,] 0.50 0.00 0.50
## [3,] 0.25 0.25 0.50
```

```
u1 <- matrix(c(0,1,0), ncol=3,nrow=1, byrow = TRUE)
u1
```

```
##      [,1] [,2] [,3]
## [1,]    0    1    0
```

```
u2 <- matrix(c(1/3,1/3,1/3), ncol=3,nrow=1, byrow = TRUE)
u2
```

```
##           [,1]      [,2]      [,3]
## [1,] 0.3333333 0.3333333 0.3333333
```

```
solve_un <- function(n, u, P){

  p_n <- P %^% n #solve for  p^n
  u_n <- u %*% p_n  #solve for uP^n

  return(u_n)


}
```

```
solve_un(10, u1, P)
```

```
##           [,1]      [,2]      [,3]
## [1,] 0.3999996 0.2000008 0.3999996
```

```r
solve_un(10,u2, P)
```

```
##           [,1]      [,2]      [,3]
## [1,] 0.3999999 0.2000001 0.3999999
```