

# STAT220 Oblig 4-5

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## Problem 6.1

Vi har gitt transition matrix P:

```
P=matrix(c(0.7, 0.2, 0.1, 0.0, 0.6, 0.4, 0.5, 0.0, 0.5), nrow=3, ncol=3, byrow = TRUE)
dimnames(P)=list(c('0','1','2'), c('0','1','2'))
print(P)
```

```
##      0    1    2
## 0 0.7 0.2 0.1
## 1 0.0 0.6 0.4
## 2 0.5 0.0 0.5
```

a) Since  $P_{i,j}^m = P(x_{m+n} = j | x_n = i)$  and  $P^{(m)} = P^m$ :

$\Rightarrow P^{(3)} = P^3$  og vi får følgende matrise

```
P_3 = P^3
print(P_3)
```

```
##      0    1    2
## 0 0.343 0.008 0.001
## 1 0.000 0.216 0.064
## 2 0.125 0.000 0.125
```

```
print(P_3[1,2])
```

```
## [1] 0.008
```

slik at:  $P(x_3 = 1 | x_0 = 0) = \underline{\underline{0.008}}$

samme egenskap gjelder også for  $P^{(3)} = P^3$

```
P_4 = P^4
print(P_4)
```

```
##      0    1    2
## 0 0.2401 0.0016 0.0001
## 1 0.0000 0.1296 0.0256
## 2 0.0625 0.0000 0.0625
```

```
print(P_4[1,2])
```

```
## [1] 0.0016
```

og vi får da:

$P(x_3 = 1 | x_0 = 0) = \underline{\underline{0.0016}}$