Chapter04.likelihood_probability

1. probability with OBP

Joey Vottos OBP = 0.46 10,000 simulated results with OBP = 0.46

```
a = rbinom(10000, 5, 0.46)
table(a) / 10000
```

```
## a
##      0      1      2      3      4      5
## 0.0452 0.1938 0.3336 0.2826 0.1245 0.0203
```

1,000 simulated result with OBP = 0.46

```
a = rbinom(1000, 5, 0.46)
table(a) / 1000
```
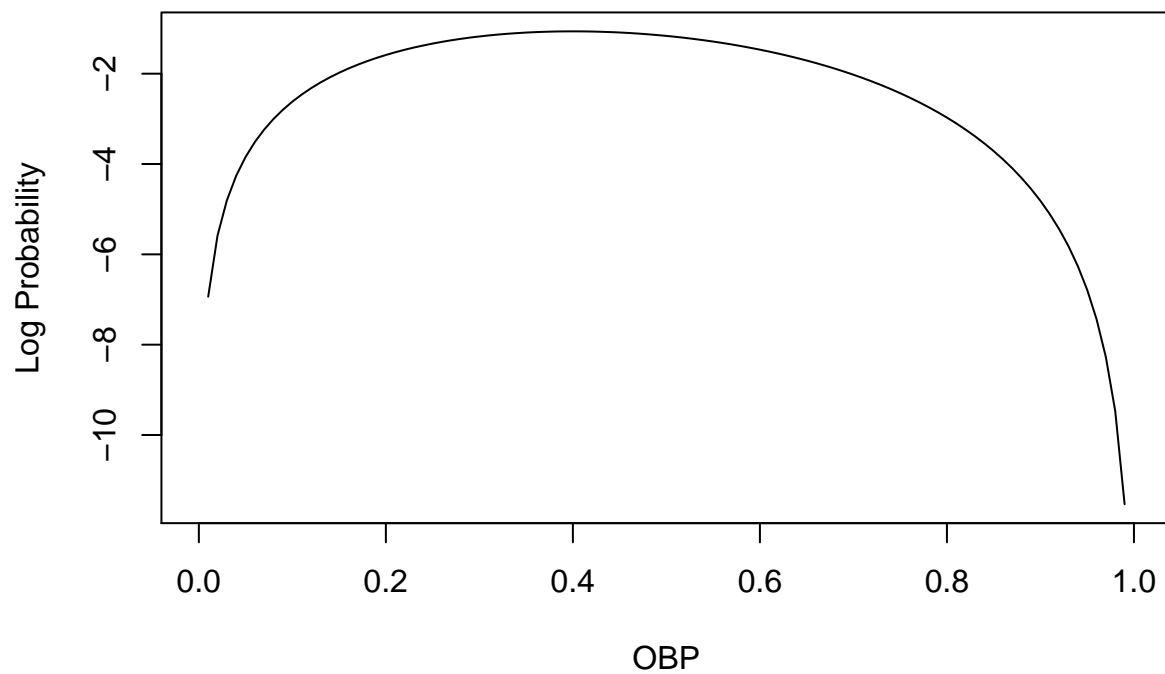
```
## a
##     0     1     2     3     4     5
## 0.059 0.182 0.325 0.284 0.126 0.024
```

2. maximum likelihood estimation

"maximum likelihood estimation" at 2times on-base against 5times on bat

1. Derivatives

```
curve(log(10*x^2*(1-x)^3), 0, 1, ylab='Log Probability', xlab='OBP')
```
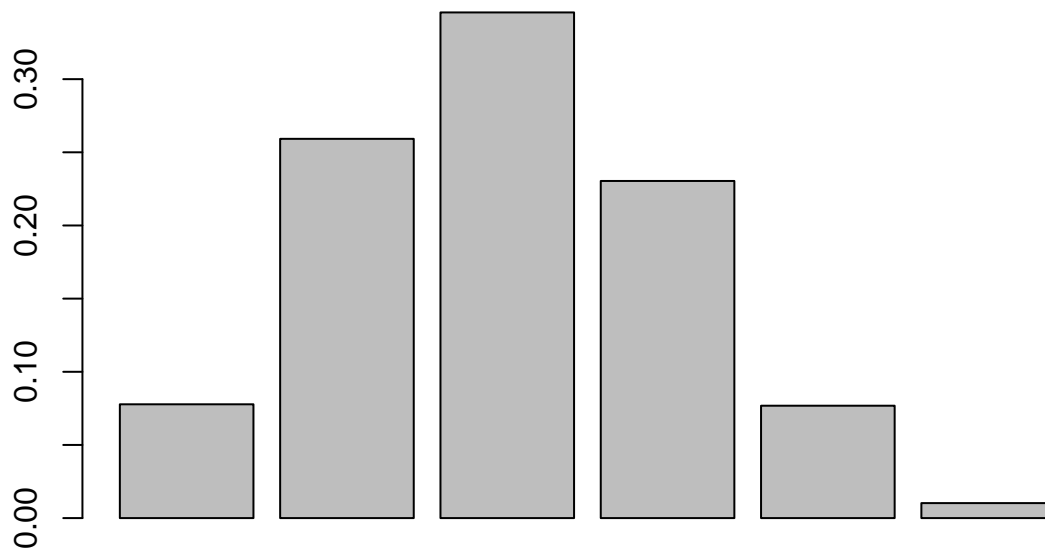
2. 6 cases of an OBP

- 5 trials and 0, 1, 2, 3, 4, 5 base on cases

```
OBP = 0.4
base = 0:5
P = OBP^base*(1-OBP)^(5-base)
case = choose(5, base)
EV = P*case
EV
```

```
## [1] 0.07776 0.25920 0.34560 0.23040 0.07680 0.01024
```

```
barplot(EV)
```

3. Different bar plots based on OBPs 0.2, 0.3, 0.4, 0.5

```
par(mfrow=c(2,2))

OBP = 0.2
base = 0:5
P = OBP^base*(1-OBP)^(5-base)
case = choose(5, base)
EV = P*case
barplot(EV, main='OBP=0.2 (20.48%)', ylab='possibility')

OBP = 0.3
base = 0:5
P = OBP^base*(1-OBP)^(5-base)
case = choose(5, base)
EV = P*case
barplot(EV, main='OBP=0.3 (30.87%)', ylab='possibility')

OBP = 0.4
base = 0:5
P = OBP^base*(1-OBP)^(5-base)
case = choose(5, base)
EV = P*case
barplot(EV, main='OBP=0.4 (34.56%)', ylab='possibility')

OBP = 0.5
base = 0:5
```

```
P = OBP^base*(1-OBP)^(5-base)
case = choose(5, base)
EV = P*case
barplot(EV, main='OBP=0.5 (31.25%)', ylab='possibility')
```

OBP=0.2 (20.48%)

OBP=0.3 (30.87%)

OBP=0.4 (34.56%)

OBP=0.5 (31.25%)