Prior distribution study

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Set up

Seed = 2021;
The number of sampling times is 1000;

Parameters

Prior distribution θ~$Beta(\alpha, \beta)$, Y~$Bin(100, \theta)$;

Scenario 1:

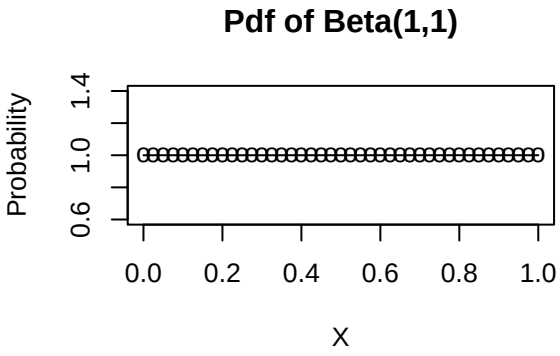
$\alpha = 1, \beta = 1$

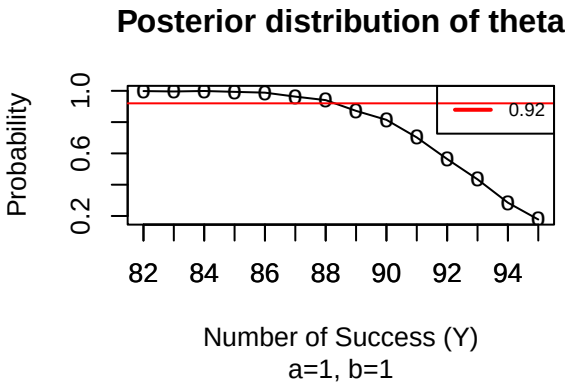
- Mean and Variance of Beta(1,1)

```
## [1] "mean =  0.5"
```

```
## [1] "variance =  0.0833333333333333"
```

- Posterior plot for number of success from 82 to 95





- Threshhold value

```
## [1] "P|Y=88: 0.9405"
```

```
## [1] "P|Y=89: 0.872"
```

Scenario 2:

$\alpha = 0.9, \beta = 0.1$

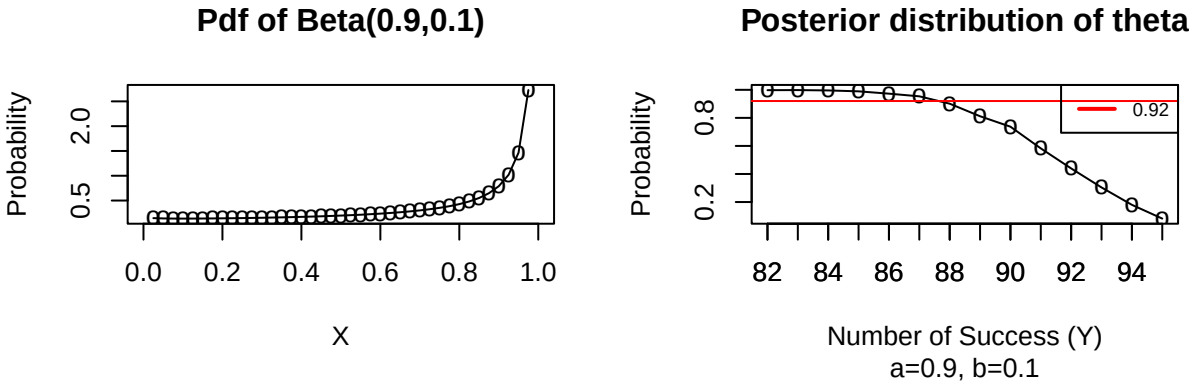
- Mean and Variance of Beta(0.9,0.1)

```
## [1] "mean =  0.9"
```

```
## [1] "variance =  0.045"
```

Mean is 0.9, and variance is relatively high.

- Posterior plot for number of success from 82 to 95



- Threshhold value

```
## [1] "P|Y=87: 0.9535"
```

```
## [1] "P|Y=88: 0.901"
```

Scenario 3:

$\alpha = 9, \beta = 1$

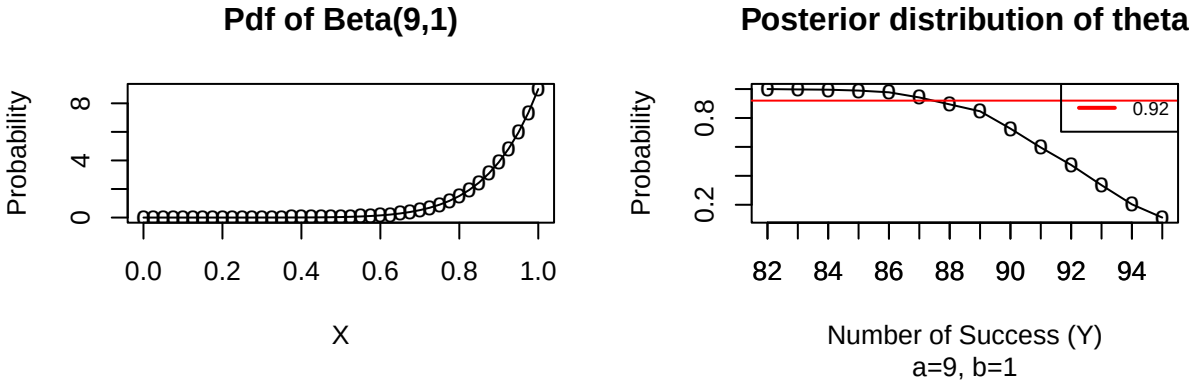
- Mean and Variance of Beta(9,1)

```
## [1] "mean =  0.9"
```

```
## [1] "variance =  0.00818181818181818"
```

Mean is 0.9, and variance is relatively medium.

- Posterior plot for number of success from 82 to 95



- Threshhold value

```
## [1] "P|Y=87: 0.942"
```

```
## [1] "P|Y=88: 0.894"
```

Scenario 4:

$\alpha = 90, \beta = 10$

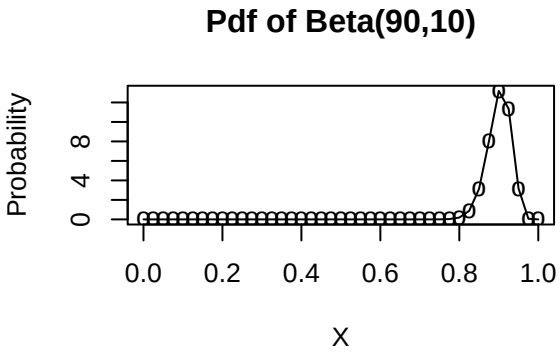
- Mean and Variance of Beta(90,10)

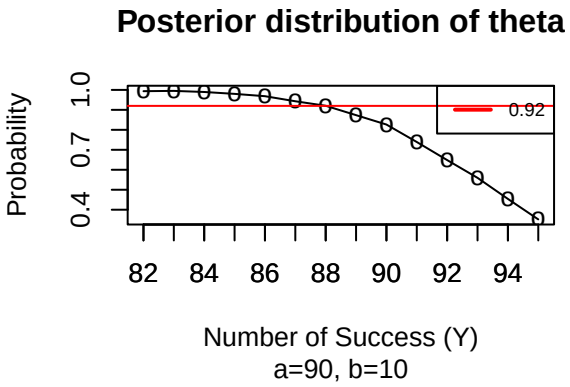
```
## [1] "mean =  0.9"
```

```
## [1] "variance =  0.000891089108910891"
```

Mean is 0.9, and variance is way lower.

- Posterior plot for number of success from 82 to 95





- Threshhold value

```
## [1] "P|Y=88: 0.9205"
```

```
## [1] "P|Y=89: 0.8735"
```