

Geometric Distribution

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1 Geometric Distribution

- Based on
- Geometric Random Variables
- Cumulative Distributive Function
- Quantile function
- Geometric expectation

"Probability with R: An Introduction with Computer Science Applications" Jane Horgan

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Calculating geometric pdfs

```
dgeom (x=4, prob=.03)  
dgeom (4, .03)
```

```
x <- 0:4  
dgeom(x, .9)  
round( dgeom(x, .95), 4)
```

Plotting geometric pdfs

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

```
x<-0:4
```

```
plot(x+1, dgeom(x, prob=.95),  
     xlab="X= number of trials", ylab="P(X=x)",  
     type="h", main="p=.95");
```

```
x<-0:9
```

```
plot(x+1, dgeom(x, prob=.5),  
     xlab="X= number of trials", ylab="P(X=x)",  
     type="h", main="p=.5");
```

```
x<-0:4
```

```
plot(x+1, dgeom(x, prob=.2),  
     xlab="X= number of trials", ylab="P(X=x)",  
     type="h", main="p=.2");
```

```
x<-0:4
```

```
plot(x+1, dgeom(x, prob=.01),  
     xlab="X= number of trials", ylab="P(X=x)",  
     type="h", main="p=.01");
```

Calculating geometric cdfs

```
pgeom(4, .03)
```

```
x<- 0:4
```

```
prob <- pgeom(x, .9)
```

```
round(prob, 4)
```

```
x<- 0:5
```

```
round(pgeom(x, .2), 4)
```

Plotting geometric cdfs

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

x<-0:4
plot(x+1, pgeom(x, prob=.95),
     xlab="X= number of trials", ylab="P(X<=x)",
     type="h", main="p=.95");

x<-0:9
plot(x+1, pgeom(x, prob=.5),
     xlab="X= number of trials", ylab="P(X<=x)",
     type="h", main="p=.5");

x<-0:4
plot(x+1, pgeom(x, prob=.2),
     xlab="X= number of trials", ylab="P(X<=x)",
     type="h", main="p=.2");

x<-0:4
plot(x+1, pgeom(x, prob=.01),
     xlab="X= number of trials", ylab="P(X<=x)",
     type="h", main="p=.01");
```

quantile function

```
qgeom(.75, .2)
```

```
pgeom(6, .2)
```


Geometric expectation

```
before <- rgeom(40, .2)
first <- before + 1
table(first)
plot(table(first/40, xlab="Number of inspection", ylab=" "))
mean(first)
var(first)
sd(first)
max(first)
```


