MA615 homework 01

Zhaobin Liu

Septemeber 16, 2018

```
pages = 1:50
misprint = 0:6
prob_misprint=ppois(q = misprint, lambda = 2, lower.tail = F)
prob_misprint
```

```
## [1] 0.864664717 0.593994150 0.323323584 0.142876540 0.052653017 0.016563608
## [7] 0.004533806
```

```
# set the pages and the misprints
# calculate the prob of misprint of zero through 6
```

```
ProbOfMoreThankMistakes=pbinom(q = pages, size = 50, prob = prob_misprint, lower.tail = T)
ProbOfMoreThankMistakes
```

```
##  [1] 1.192109e-41 7.200486e-17 8.070732e-06 1.400498e-01 9.533530e-01
##  [6] 9.999817e-01 1.000000e+00 5.710837e-29 2.398478e-09 3.933993e-02
## [11] 9.539976e-01 9.999987e-01 1.000000e+00 1.000000e+00 1.080295e-19
## [16] 8.291160e-05 6.619208e-01 9.999700e-01 1.000000e+00 1.000000e+00
## [21] 1.000000e+00 1.961692e-12 3.815400e-02 9.929084e-01 1.000000e+00
## [26] 1.000000e+00 1.000000e+00 1.000000e+00 7.155883e-07 5.876265e-01
## [31] 9.999956e-01 1.000000e+00 1.000000e+00 1.000000e+00 1.000000e+00
## [36] 5.389467e-03 9.893665e-01 1.000000e+00 1.000000e+00 1.000000e+00
## [41] 1.000000e+00 1.000000e+00 5.235893e-01 9.999982e-01 1.000000e+00
## [46] 1.000000e+00 1.000000e+00 1.000000e+00 1.000000e+00 1.000000e+00
```

```
# Probability of T no more than n pages with more than k misprints
```

```
library(knitr)
table=data.frame(matrix(ncol=7, nrow =50))
for(i in 1:50){
  table[i, ]=pbinom(i, 50, prob=prob_misprint, lower.tail = F)
}
kable(table)
```

X1	X2	X3	X4	X5	X6	X7
1.0000000	1.0000000	0.9999999	0.9958095	0.7471706	0.2008398	0.0218035
1.0000000	1.0000000	0.9999990	0.9805289	0.4939971	0.0500864	0.0015577
1.0000000	1.0000000	0.9999919	0.9397742	0.2688572	0.0094612	0.0000824
1.0000000	1.0000000	0.9999523	0.8599502	0.1218277	0.0014214	0.0000034
1.0000000	1.0000000	0.9997779	0.7375341	0.0466470	0.0001757	0.0000001
1.0000000	1.0000000	0.9991531	0.5844897	0.0153082	0.0000183	0.0000000
1.0000000	1.0000000	0.9972767	0.4241321	0.0043598	0.0000016	0.0000000
1.0000000	1.0000000	0.9924574	0.2804557	0.0010891	0.0000001	0.0000000
1.0000000	1.0000000	0.9817115	0.1686896	0.0002408	0.0000000	0.0000000
1.0000000	1.0000000	0.9606601	0.0923041	0.0000475	0.0000000	0.0000000
1.0000000	0.9999999	0.9240833	0.0460024	0.0000084	0.0000000	0.0000000
1.0000000	0.9999996	0.8672836	0.0209184	0.0000013	0.0000000	0.0000000
1.0000000	0.9999983	0.7879527	0.0086961	0.0000002	0.0000000	0.0000000
1.0000000	0.9999931	0.6877748	0.0033116	0.0000000	0.0000000	0.0000000

X1	X2	X3	X4	X5	X6	X7
1.0000000	0.9999750	0.5728960	0.0011574	0.0000000	0.0000000	0.0000000
1.0000000	0.9999171	0.4528233	0.0003719	0.0000000	0.0000000	0.0000000
1.0000000	0.9997476	0.3380792	0.0001101	0.0000000	0.0000000	0.0000000
1.0000000	0.9992929	0.2375648	0.0000300	0.0000000	0.0000000	0.0000000
1.0000000	0.9981727	0.1566773	0.0000076	0.0000000	0.0000000	0.0000000
1.0000000	0.9956323	0.0967715	0.0000018	0.0000000	0.0000000	0.0000000
1.0000000	0.9903228	0.0558806	0.0000004	0.0000000	0.0000000	0.0000000
1.0000000	0.9800833	0.0301257	0.0000001	0.0000000	0.0000000	0.0000000
1.0000000	0.9618460	0.0151445	0.0000000	0.0000000	0.0000000	0.0000000
1.0000000	0.9318294	0.0070916	0.0000000	0.0000000	0.0000000	0.0000000
1.0000000	0.8861579	0.0030899	0.0000000	0.0000000	0.0000000	0.0000000
1.0000000	0.8219096	0.0012514	0.0000000	0.0000000	0.0000000	0.0000000
1.0000000	0.7383572	0.0004705	0.0000000	0.0000000	0.0000000	0.0000000
0.9999999	0.6379469	0.0001641	0.0000000	0.0000000	0.0000000	0.0000000
0.9999993	0.5265038	0.0000530	0.0000000	0.0000000	0.0000000	0.0000000
0.9999967	0.4123735	0.0000158	0.0000000	0.0000000	0.0000000	0.0000000
0.9999862	0.3046478	0.0000044	0.0000000	0.0000000	0.0000000	0.0000000
0.9999463	0.2110700	0.0000011	0.0000000	0.0000000	0.0000000	0.0000000
0.9998072	0.1363940	0.0000003	0.0000000	0.0000000	0.0000000	0.0000000
0.9993629	0.0817678	0.0000001	0.0000000	0.0000000	0.0000000	0.0000000
0.9980652	0.0452333	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
0.9946105	0.0229622	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
0.9862590	0.0106335	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
0.9680047	0.0044629	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
0.9321194	0.0016852	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
0.8690692	0.0005676	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
0.7708176	0.0001688	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
0.6363030	0.0000438	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
0.4764107	0.0000097	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
0.3138896	0.0000018	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
0.1754421	0.0000003	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
0.0792955	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
0.0270158	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
0.0061397	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
0.0006956	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000

```
# make the table by the kable function
```

$p = e^{-\lambda} * -\lambda/k!$

Cited: http://www.sundayassemblyla.org/book_club_0718

Figure 1: books