

MECH 262 (Measurement Lab) & Statistics

October 12, 2007

Poisson Distribution

1 A Program in “Baby” GW-BASIC

Here is a computational procedure useful in many problems where a Poisson's probability distribution is a valid event probability model. Read Wheeler and Ganji Ch.6, pp.131-133 and try out the worked examples there, *i.e.*, Examples 6.6,7,8.

```
100 PRINT"Poisson, enter average, exactly(+), at least(-)"
110 INPUT L,N:P=0:EML=1/EXP(L):X=N
120 IF N<0 THEN X=ABS(N)
130 GOSUB 1000
140 P=P+L^X*EML/F
150 IF N>=0 OR X=0 THEN GOTO 500
160 X=X-1:GOTO 130
170 REM *****
500 PRINT P:STOP:END
510 REM *****
1000 F=1:IF X<=0 OR X=1 THEN RETURN
1010 FOR I=2 TO X
1020 F=F*I
1030 NEXT I
1040 RETURN
1050 REM *****
2000 REM Mean, L, and the probability of number of "arrivals", N
2010 REM within a specified time period are supplied. If N<0 is
2020 REM supplied then the probability of "at least" is computed
2030 REM by summing with respect to X=0 through X=-N. This
2040 REM procedure can be used, instead of binomial distribution,
2050 REM when the sample is large, like the 450 guys, 8 of which
2060 REM got cancer, and the event frequency is small, i.e.,
2070 REM 8/450 or, in the general population, 1/1500.
2080 REM (26)PDist41v.bas, 04-01-22.
```

2 A Result and a Question

Looking at Example 6.6 we type and see

```
run
Poisson, enter average, exactly(+), at least(-)
? 3,0
4.978707432746887D-02
OK
```

Well, that was fine. Now try the other two problems, especially the parts where you have to complement the result like with the binomial examples with 6, 12 and 18 dice, *i.e.*, use $q = 1 - p$ to get the answer. Is the program bad? Are the instructions bad? Explain. This is not a “hand-in” exercise. But this sort of thing will enable you to use statistical tools correctly and with confidence.

(26)PDist41v.bas(MECH 261-2)PDist71z.tex