Re: urn model

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- *From*: randerson1184 <randerson1184@xxxxxxxxx>
- *Date*: Mon, 9 Jun 2008 14:26:31 −0700 (PDT)

On Jun 9, 3:08 pm, isabelle...@xxxxxxxxxxx wrote:

> On Jun 9, 3:54 pm, randerson1184 <randerson1...@xxxxxxxxx> wrote:
>
> > On Jun 9, 2:51 pm, randerson1184 <randerson1...@xxxxxxxxx> wrote:
> >
> > > On Jun 9, 2:46 pm, Paul Rubin <ru...@xxxxxxx> wrote:
> > >
> > > > isabelle...@xxxxxxxxxxx wrote:
> > >
> > > > > On Jun 9, 2:36 pm, Paul
> > > > > Rubin <ru...@xxxxxxx>
> > > > > wrote:
> > >
> > > > > > isabelle...@xxxxxxxxxxx
> > > > > > wrote:
> > >
> > > > > > > Hi
> > > > > > > everybody,
> > > > > > > I
> > > > > > > am
> > > > > > > having
> > > > > > > a
> > > > > > > hard
> > > > > > > time
> > > > > > > writing
> > > > > > > the
> > > > > > > likelihood
> > > > > > > of
> > > > > > > the
> > > > > > > following
> > > > > > > urn

model. I would need to find the maximum likelihood estimator of p, so I only need those terms of the likelihood that are functions of p. I have not seen very many urn problems in my textbooks, if there is a reference with urn problems, I will gladly read it. We

continue to draw balls with replacement from an urn containing both black and white balls until two balls of the same color are drawn. Let X be the number of draws (including the first draw) we take until we stop. We are not told how many black and white balls that

we see, but only the value of X. Let p be the unknown proportion of white balls in the urn. I greatly appreciate your help. Here is my work so far. X can take only two values: 2 or 3. The sample space is BB, X=2 WW, X=2 BWB, X=3 BWW,

X=3 WBB, X=3 WBW, X=3 When X=2, the likelihood can be proportional to p^2 or (1−p)^2. When X=3, the likelihood can be proportional to p^1*(1−p)^2 or p^2*(1−p)^1.

You need to rethink that last line a bit. If necessary, try assuming a value such as 0.1 for p and see what you come up with for the probabilities of X=2 and X=3.

/Paul

I am not sure how to do this.
I do not have a method to
write the
probabilities. Here is an
attempt.

P[X=2]=P[BB or
WW]=P[BB]+P[WW]=constant1*{p^2
+ (1−p)^2}

P[X=3]=P[BWB]+P[BWW]+P[WBW]+...
=constant2*{2*p^1*(1−p)^2
+ 2*p^2*(1− p)^1}

You are on the right track. Why do feel the
need for constant1 and
constant2? You have six possible sequences
listed above. Write the
probability of each in terms of p, and see
where that takes you.

/Paul

I got that X~Ber(2p−2p^2−p^3)
I defined a success as X=3 for which the probability is the
2p−2p^2−
p^3
So from here, I just use the likelihood function to find the
MLE of p
right?

I think I need to make the simple transformation Y=X−2 and then
declare it bernoulli...

I am finding
X−2~Bernoulli(2p−2p^2)

thanks a lot for your help

Yep, you're right, 2p − 2p^2. Let me know what you get for your MLE.
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