MRN093

May 2000 / with Jack Xie

Statistiks of clusters

a_i probability that an event will induce i subsequent events

P_i probability that a cluster has i events

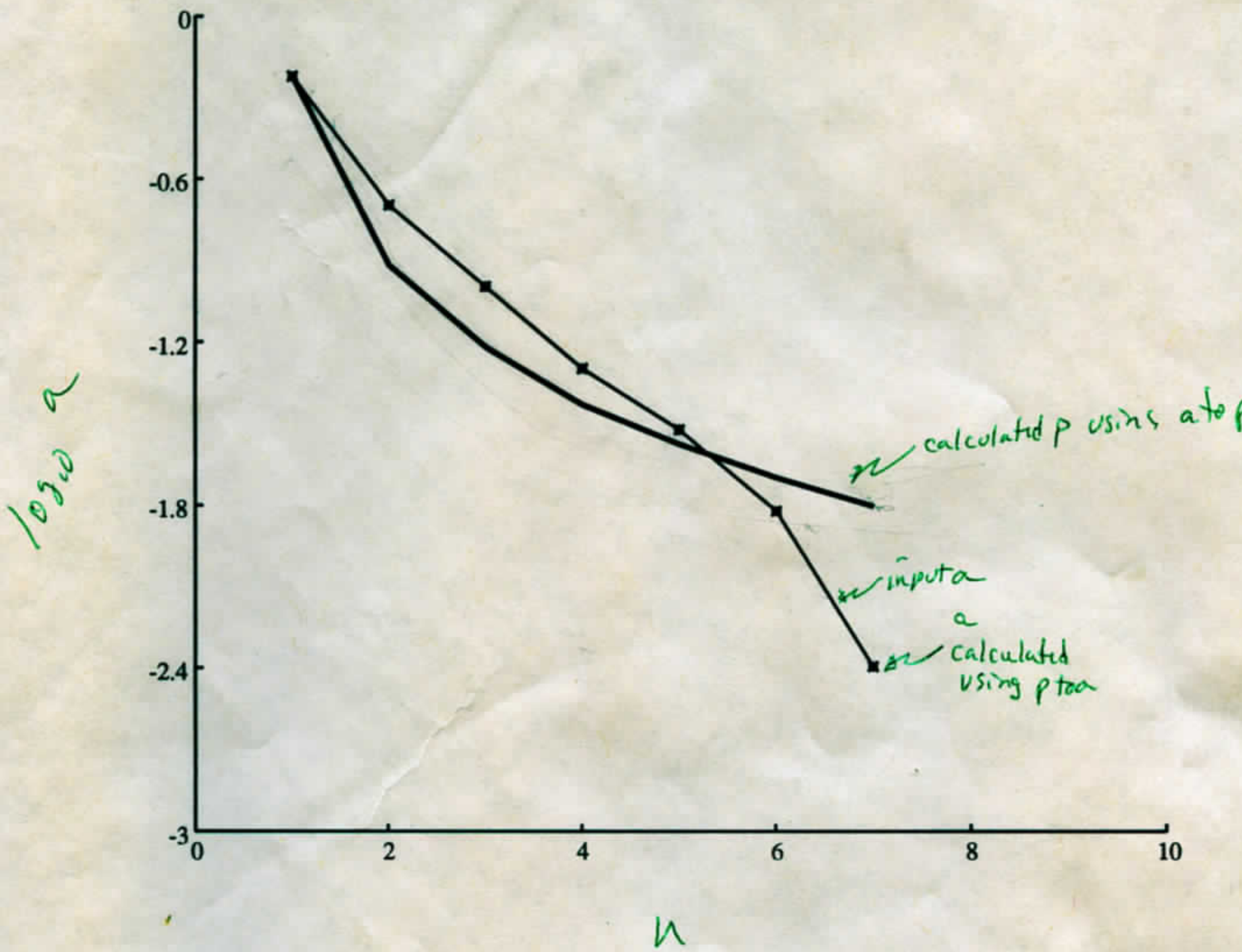
use tree analysis, assuming stationarity of a_i's. P_i is polynomial in $a_{j<i}$.

Jack has data P_i, $i = 1, \ldots 6$ for new Madrid

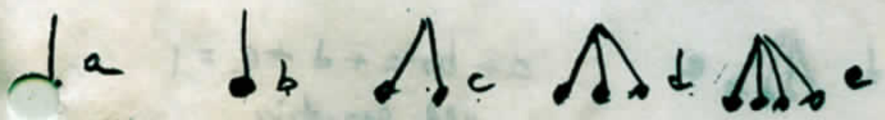
1. Calculated polynomials by computing random trees & finding unique sets.
2. code to evaluate polynomial $P(a)$ and back-solve it $a(P)$
3. But jack's data has random error. Use poisson-distribution* to compute alternative datasets, with rates in accordance with the probability that they match jack's rates.

$$^{*}P_n(r) = \frac{(RT)^n e^{-RT}}{n!}$$

PTOA



0
-0.6
-1.2
-1.8
-2.4
-3
0
2
4
6
8
10
log a
n
calculated p using a to p
input a
a calculated using p to a



$a+b+c+d+e=1$
all positive.

ways to get 1

$P(1) = a$

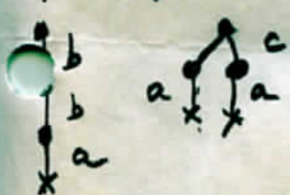
$\therefore a = P_1$

ways to get 2

$P(2) = ab$

$\therefore b = \frac{P_2}{P_1}$

ways to get 3

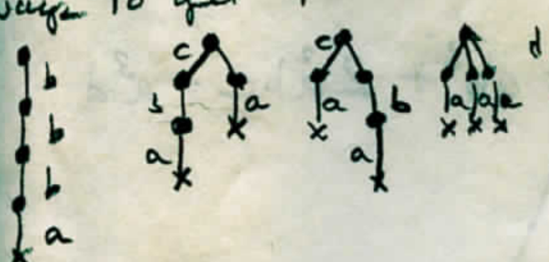


$P(3) = ab^2 + a^2c$

$c = \frac{P_3}{a^2} - \frac{b^2}{a} = \frac{P_3}{P_1^2} - \frac{P_2^2}{P_1^3}$

$= \frac{1}{P_1^3}\left(P_1P_3 - P_2^2\right)$

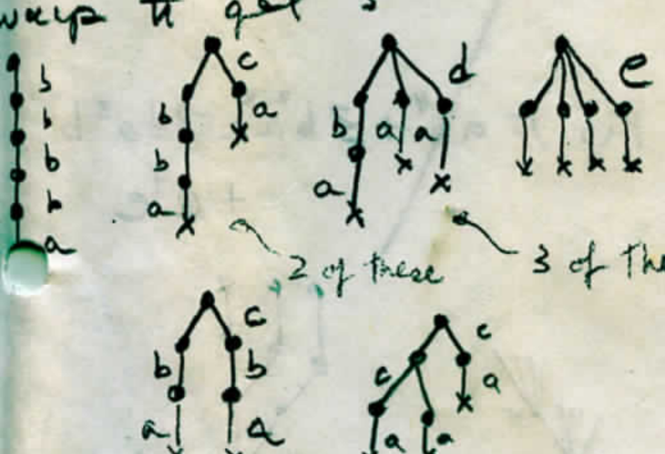
ways to get 4



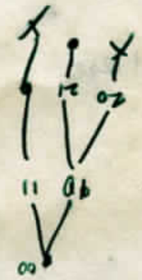
$P(4) = ab^3 + 2a^2bc + a^3d$

$\therefore d$

ways to get 5



$P(5) = ab^4 + 3b^2a^2c + 3da^3b$
$+ a^4e$
$+ 2c^2a^3$



$\therefore e$