

P(u) = ((1- 1/n) ^u)\*(1-(1-1/m)^(u\*h))^h

P’=1\*(1-(1-1/m)^(u\*h))^h+((1- 1/n) ^u)\*( (1-(1-1/m)^(u\*h))^h)’

=1\*(1-(1-1/m)^(u\*h))^h+h\*(1- 1/n) ^u)\*( (1-(1-1/m)^(u\*h))^(h-1))\* (1-(1-1/m)^(u\*h))’

=1\*(1-(1-1/m)^(u\*h))^h+h\*(1- 1/n) ^u)\*( (1-(1-1/m)^(u\*h))^(h-1))\*(-u\*h\*)(1-1/m)^ (u\*h-1)

~= e^(-u/n)\*(1-e^(-u\*h/m)))^h

取log e

= h\*log(1-e^(-u\*h/m))+log(e^(-u/n))

H ~= log e (2)\* m/u



**h= 0.693\*(20000/10000)~=1.4**

U: 10000, M:20000, N=200

Filter Error: 735678, Num of query: 1000000

U: 10000, M:20000, #hash function: 5

P(u):(filter error/Num of query)= 0.735678

Filter Error: 3676671, Num of query: 10000000

U: 1000, M:2000, #hash function: 4

P(u):(filter error/Num of query)= 0.367667

Filter Error: 5414588, Num of query: 10000000

U: 1000, M:2000, #hash function: 3

P(u):(filter error/Num of query)= 0.541459

Filter Error: 0, Num of query: 10000000

U: 1000, M:2000, **#hash function: 2**

P(u):(filter error/Num of query)= 0.000000

Filter Error: 9041305, Num of query: 10000000

U: 1000, M:2000, #hash function: 1

P(u):(filter error/Num of query)= 0.904131

**h= 0.693\*(30000/10000)~=2.1**

U: 10000, M:30000, N=200

Filter Error: 737002, Num of query: 1000000

U: 10000, M:30000, #hash function: 1

P(u):(filter error/Num of query)= 0.737002

Filter Error: 272674, Num of query: 1000000

U: 10000, M:30000, #hash function: 2

P(u):(filter error/Num of query)= 0.272674

Filter Error: 59425, Num of query: 1000000

U: 10000, M:30000,  **#hash function: 3**

P(u):(filter error/Num of query)= 0.059425

Filter Error: 24640, Num of query: 1000000

U: 10000, M:30000, #hash function: 4

P(u):(filter error/Num of query)= 0.024640

Filter Error: 735888, Num of query: 1000000

U: 10000, M:30000, #hash function: 5

P(u):(filter error/Num of query)= 0.735888