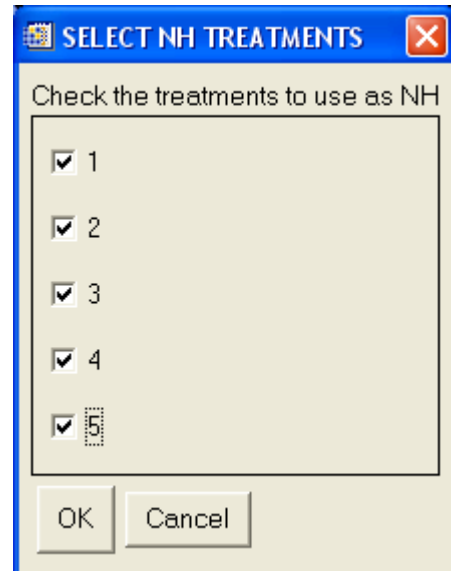
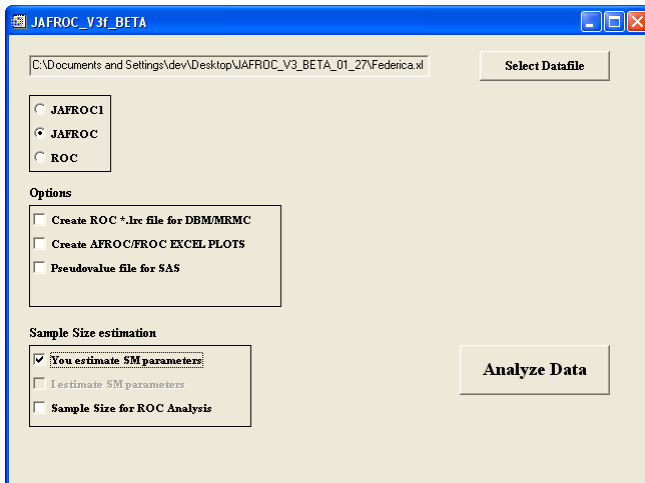
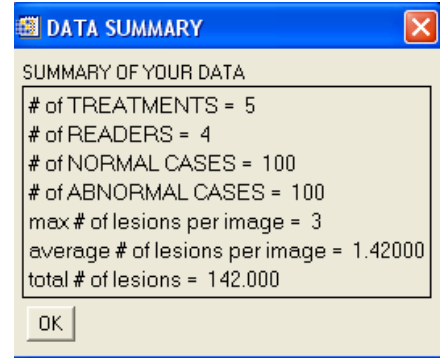
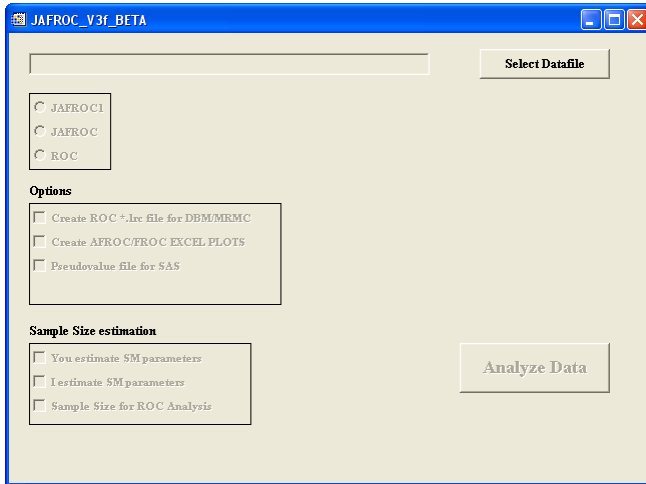
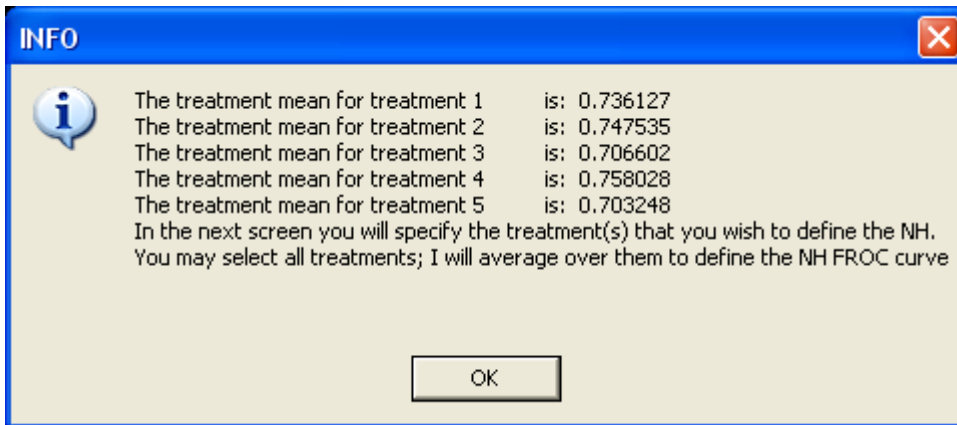


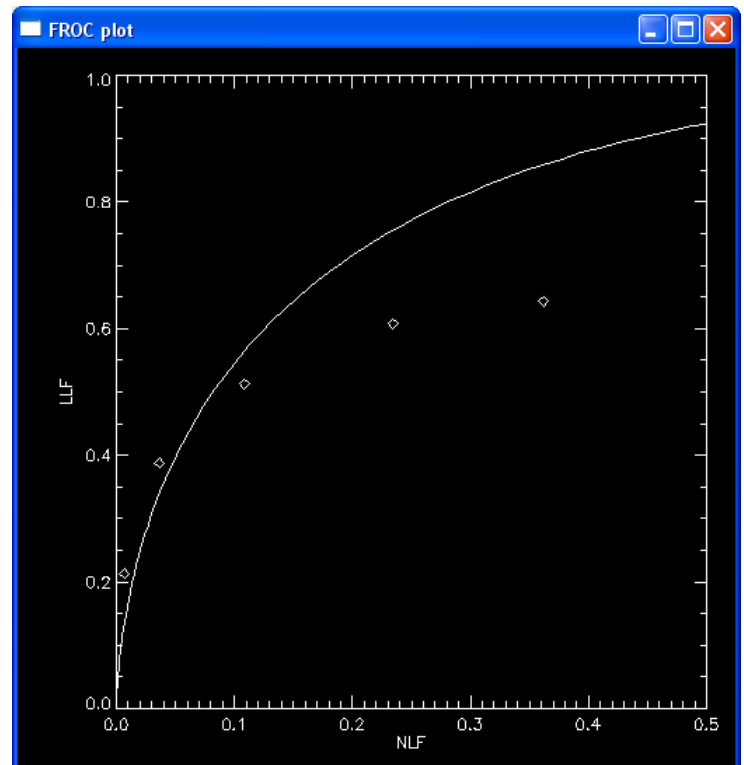
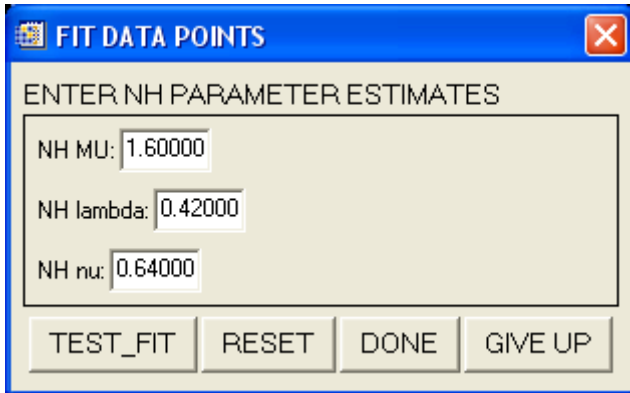
# SAMPLE SIZE ESTIMATION USING SEARCH MODEL

## A VERY PRELIMINARY DRAFT

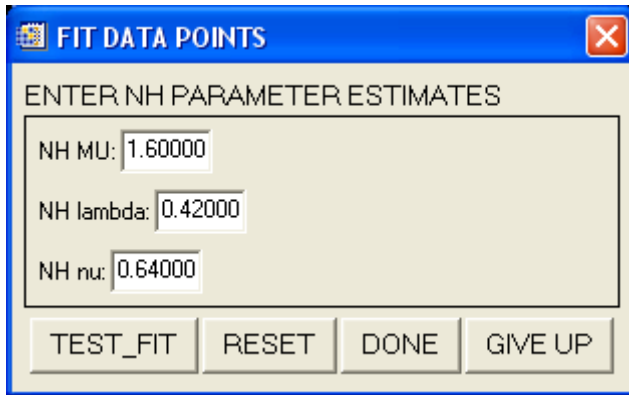




The objective is to fit the observed FROC data points (pooled over all readers and the modalities chosen previously) by adjusting the search model parameters. Initial software default is way off.



After some playing around with the parameters ( $\mu$  affects steepness of the rise from zero;  $\lambda$  is the maximum x value and  $\nu$  is the maximum y value) we get a decent fit:



**FIT DATA POINTS**

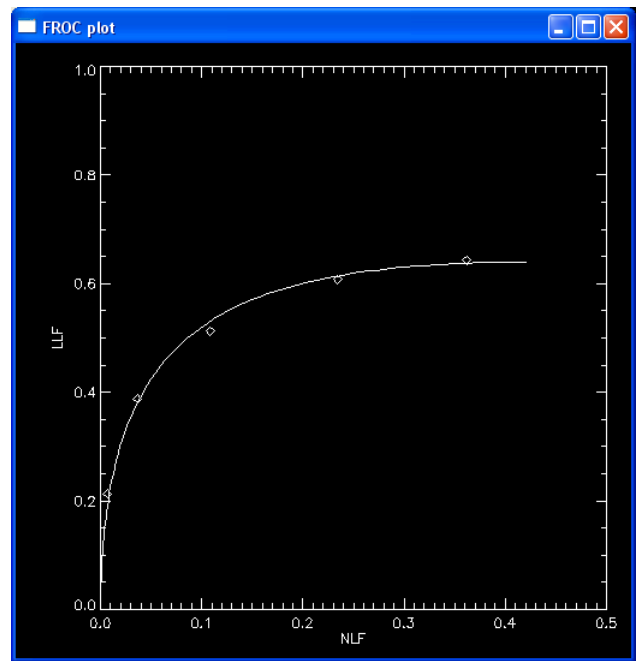
ENTER NH PARAMETER ESTIMATES

NH  $\mu$ : 1.60000

NH  $\lambda$ : 0.42000

NH  $\nu$ : 0.64000

TEST\_FIT   RESET   DONE   GIVE UP



CLICK "DONE"

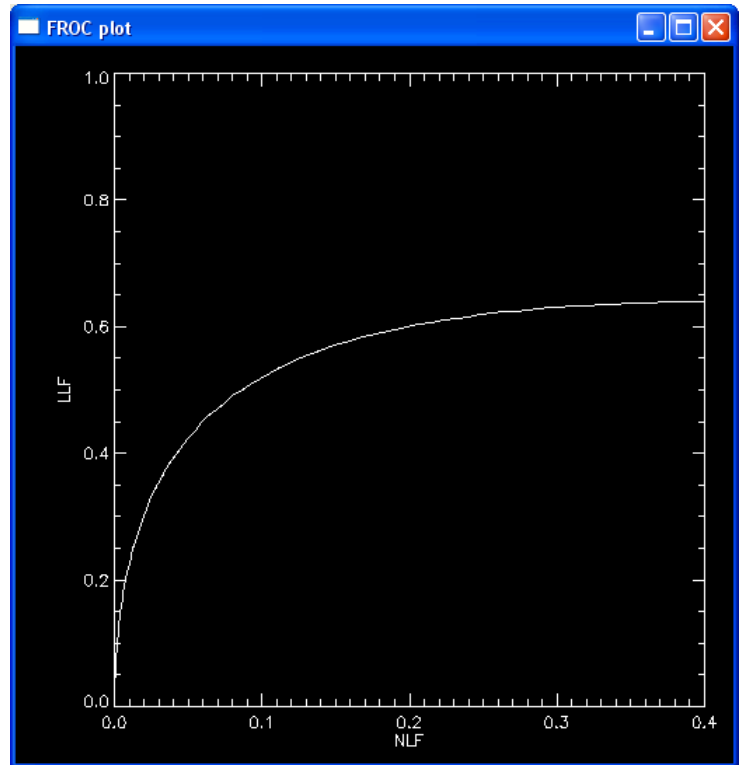
Software starts by setting  $AH = NH$ . This is why the effect sizes are zero. The dotted AH curve is superposed on the solid NH curve, which is why you cannot see it.

**ADJ AH PARMS FOR DESIRED...**

**NH PARAMETERS**  
NH\_MU = 1.60000  
NH\_LAMBDA = 0.420000  
NH\_NU = 0.640000

**AH PARAMETERS**  
AH MU   
AH lambda   
AH nu

NH\_ROC\_AUC = 0.831245  
AH\_ROC\_AUC = 0.831245  
NH\_JAFROC\_AUC = 0.726055  
AH\_JAFROC\_AUC = 0.726055  
ROC\_EFFECT\_SIZE = 0.000000  
JAFROC\_EFFECT\_SIZE = 0.000000



Objective is to make ROC effect size = 0.05 (or whatever you want it to be, e.g., 0.03) by adjusting the parameters. My first try is not too good as ROC effect size is too small.

**ADJ AH PARMS FOR DESIRED ...**

NH PARAMETERS  
NH\_MU = 1.60000  
NH\_LAMBDA = 0.420000  
NH\_NU = 0.640000

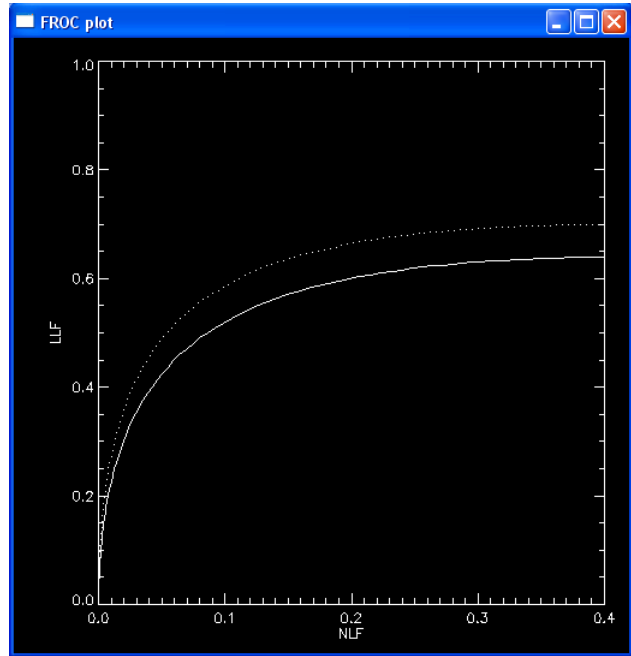
AH PARAMETERS  
AH MU   
AH lambda   
AH nu

NH\_ROC\_AUC = 0.831245  
AH\_ROC\_AUC = 0.858711

NH\_JAFROC\_AUC = 0.726055  
AH\_JAFROC\_AUC = 0.767115

ROC\_EFFECT\_SIZE = 0.0274662  
JAFROC\_EFFECT\_SIZE = 0.0410607

TEST   RESET   DONE



After some experimentation ( $\nu$  has largest effect on the effect size, next is  $\mu$  and  $\lambda$  has the least effect). Large  $\mu$  and / or  $\nu$  increase the effect size while larger  $\lambda$  decreases the effect size.

ADJ AH PARMS FOR DESIRED ...

NH PARAMETERS

NH\_MU = 1.60000  
NH\_LAMBDA = 0.420000  
NH\_NU = 0.640000

AH PARAMETERS

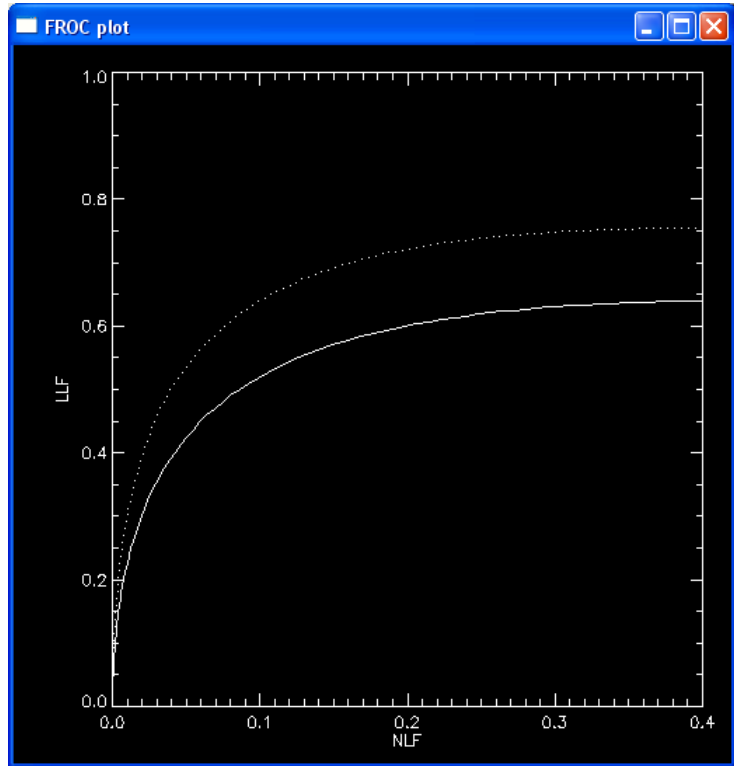
AH MU   
AH lambda   
AH nu

NH\_ROC\_AUC = 0.831245  
AH\_ROC\_AUC = 0.881249

NH\_JAFROC\_AUC = 0.726055  
AH\_JAFROC\_AUC = 0.804558

ROC\_EFFECT\_SIZE = 0.0500045  
JAFROC\_EFFECT\_SIZE = 0.0785028

TEST RESET DONE



Now click "DONE"

**SAMPLE\_SIZE**

GENERALIZATION TO:

RANDOM\_ALL  
 RANDOM\_CASES  
 RANDOM\_READERS

NEEDED INPUT

NUMBER OF READERS:   
JAFROC EFFECT SIZE:   
NH AUC = 0.831245  
AH AUC = 0.881249  
VAR\_TR = -0.00033255003  
VAR\_TC = 0.0078741574  
VAR\_TRC = 0.091269329  
DESIRED POWER (1-BETA):   
ALPHA:

PREDICTION

NUMBER OF CASES:

**SAMPLE\_SIZE**

GENERALIZATION TO:

RANDOM\_ALL  
 RANDOM\_CASES  
 RANDOM\_READERS

NEEDED INPUT

NUMBER OF READERS:   
JAFROC EFFECT SIZE:   
NH AUC = 0.831245  
AH AUC = 0.881249  
VAR\_TR = -0.00033255003  
VAR\_TC = 0.0078741574  
VAR\_TRC = 0.091269329  
DESIRED POWER (1-BETA):   
ALPHA:

PREDICTION

NUMBER OF CASES:

Left is default screen. Now you can adjust the generalization method, the number of readers, desired power and alpha, **but not number of cases** (this is calculated by the program). Click "CALCULATE" to determine number of cases. If unhappy with choice of JAFROC effect size you can adjust it, but keep in mind that if you make it smaller, the corresponding ROC effect size is also going to be smaller.

Dev P. Chakraborty  
 Wednesday, January 27, 2010