

## **Fits to Michigan liver data by the CV model. The problem of correlation between the model parameters.**

The Michigan liver data were fitted by Jackson's and Niemierko's modifications of the Critical Volume model. The minimum of the logLikelihood function found by us differs from the one found by Jackson. Considerable correlation between two of the parameters in both model modifications, namely the relative critical volume,  $v_{50}$  (or  $\mu_{cr}$ ) on one hand and  $D_{50}$  of an FSU, on the other hand is observed.

When Jackson's modification is used, the correlation plots between  $v_{50}$  and  $D_{50}$  show that if we accept all sets of parameters values for which  $l < l_{Jackson}$  at then all  $v_{50}$  in the range of [0.12,0.55] and  $D_{50}$  in the range of [38,340]Gy describe equally well the data (the proper Monte-Carlo investigation may prove it) and one cannot distinguish between them.

Hence, we make the conclusion that **either**

*the data set (DVH,Response) is not full enough in order to decrease the correlation between the parameters*

**or**

*parameters correlation is inherent to the model(s) which does not allow the determination of the exact values of  $v_{50}$  and  $D_{50}$  no matter how full the initial data set (DVH , Response) is. But for each set of  $(v_{50}, D_{50})$  the theoretical NTCP values fit and predict well enough the experiment.*