Update of Method of Moments in $B^0 \to K^* \mu^- \mu^+$

LHCb

Marcin Chrząszcz
mchrzasz@cern.ch

University of Zurich

Referee meeting, CERN
August 19, 2015

$\Rrightarrow$ From last time the only remaining issue as far as we saw was the calculation of P_i from S_i observables.

$\Rrightarrow$ Today we give some of the methods that we studied and explain what we would like to do.
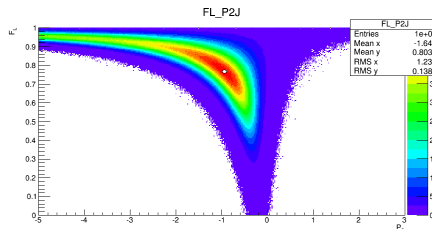
Jacobian transformation

- Now how does the new space look like.
- Important to take into account the boundary as without all my theorems fall down.
- The white point is the value from which the toy was generated.
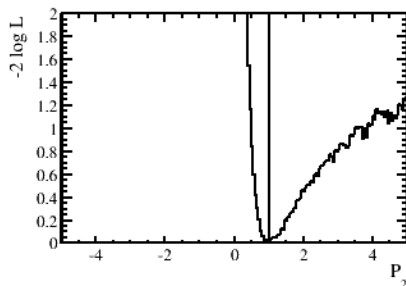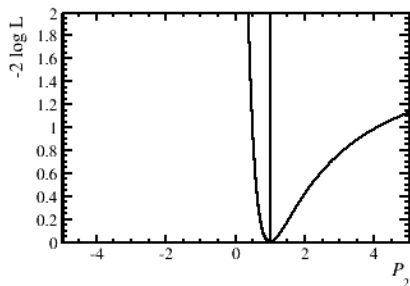
Scatter plot $F_L : P_2$, no Jacobian
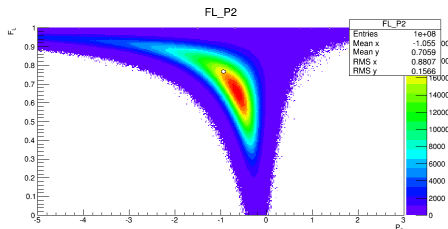
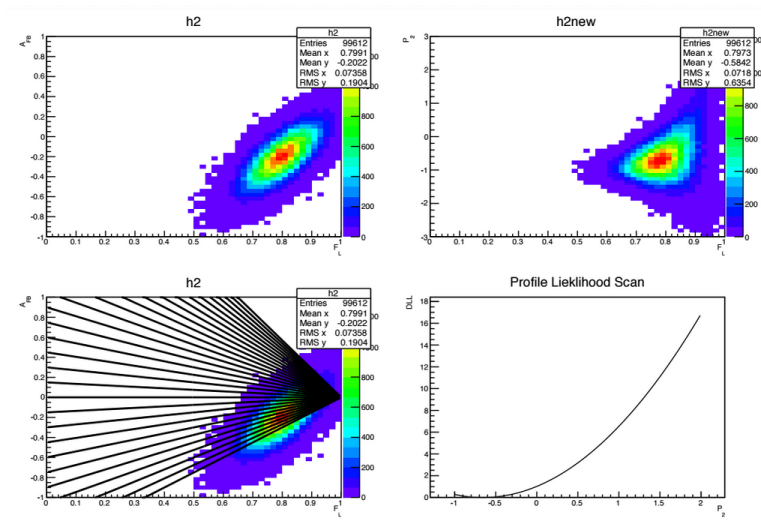Scatter plot $F_L : P_2$, with Jacobian

Re parametrization of pdf

- Re parametrization of the pdf gives exactly the same answer as toys taking into account the jacobian:

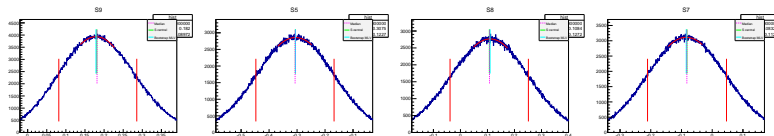Profile likelihood from re-parametrised pdf. Profile likelihood from toys with Jacobian

Profile likelihoods

$\Rrightarrow$ Gives the same answer as the Jacobian.

Quantiles

- Apparently quantiles stay invariant under transformations....
- One can just calculate the 68% around the median.
- This is our prefered option.
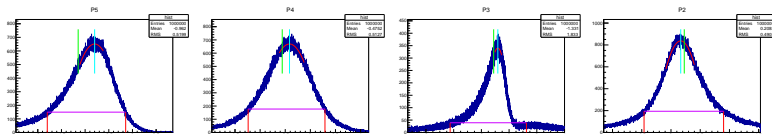
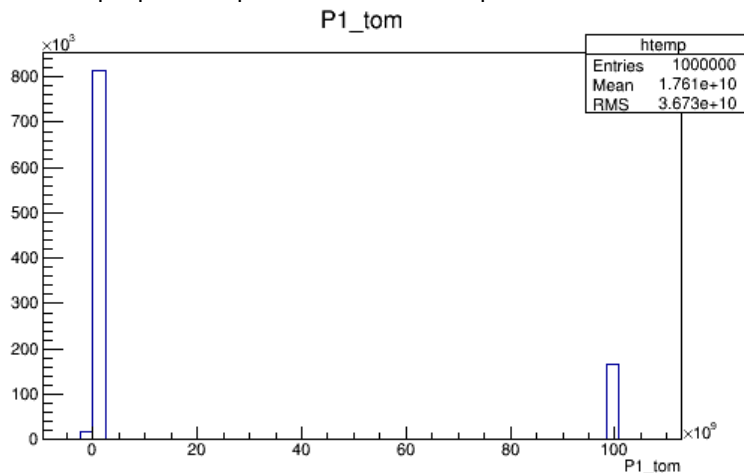# Quantiles

- Apparently quantiles stay invariant under transformations....
- One can just calculate the 68% around the median.
- This is our prefered option.

Unphysical values of F_L

$\Rightarrow$ One of the problems is that for some cases F_L goes beyond 1.
This might be a problem for some of the P_i (ex. $P_5 = \frac{S_5}{\sqrt{F_L(1-F_L)}}$).

$\Rightarrow$ We propose to put thouse bootstraps in the $\pm\infty$:

Conclusions

- We have all the numbers in the note.
- We decided to use the Quantiles for error propagation.
- If referees agree with this we would like to get this aproved.

Backup