Subject: combinations of pid algorithms
Posted by Dmitry Khaneft on Wed, 16 May 2012 13:31:21 GMT
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Dear all,

I have another issue. I tried different combinations of PID algorithms and found out a strange thing.

For example if I use following code with "PidAlgoEmcBayes" enabled only

theAnalysis->FillList(eplus, "ElectronVeryTightPlus","PidAlgoEmcBayes");

or another one with many others included

theAnalysis->FillList(eplus, "ElectronVeryTightPlus","PidAlgoEmcBayes;PidAlgoStt;PidAlgoMvd;PidAlgoDrc;PidAlgoDisc;PidAlgoMvd");

then the first case gives me less events compare to the second one. It seems very strange for me. I would expect that by adding new algorithms I should be getting less rather then more events.

Cheers,
Dmitry

Subject: Re: combinations of pid algorithms
Posted by StefanoSpataro on Wed, 16 May 2012 13:36:38 GMT
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Dmitry Khaneft wrote on Wed, 16 May 2012 15:31
the first case gives me less events compare to the second one. It seems very strange for me. I would expect that by adding new algorithms I should be getting less rather then more events.

Why? If you multiply your initial pdf with another pdf, you will obtain a different probability distribution. I cannot see a direct correlation of drop in efficiency with increasing number of algorithms.

Subject: Re: combinations of pid algorithms
Posted by Dmitry Khaneft on Wed, 16 May 2012 13:42:20 GMT
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Stefano Spataro wrote on Wed, 16 May 2012 15:36
Why? If you multiply your initial pdf with another pdf, you will obtain a different probability
distribution. I cannot see a direct correlation of drop in efficiency with increasing number of
algorithms.

Sorry may be I was not clear. It is exactly what I would expect but for some reason my results
are opposite. Efficiency goes up with increasing number of algorithms.

Subject: Re: combinations of pid algorithms
Posted by StefanoSpataro on Wed, 16 May 2012 13:43:50 GMT
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I am not saying that this is correct. I am just saying that the two things are uncorrelated, I
would say.

Subject: Re: combinations of pid algorithms
Posted by Dmitry Khaneft on Wed, 16 May 2012 13:53:19 GMT
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Hm. I was following tutorial and found these lines

Quote:
...

theAnalysis->FillList(looseElectrons, "ElectronLoose",
"PidAlgoEmcBayes;PidAlgoDrc;PidAlgoMvd");

In this case the probabilities for PID selection are achieved by multiplying the probability values
of the chosen algorithms, i.e. $Pe = Pe,1 \times Pe,2 \times Pe,3$, etc.

The only case one can get increase in efficiency is if one of the probabilities >1 what is
impossible. Am I right?

Subject: Re: combinations of pid algorithms
Posted by StefanoSpataro on Wed, 16 May 2012 13:57:40 GMT
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I understand the sentence can be misleading.
The algorithm multiply PDFs (probability density functions), but the final probability is the pdf
divided by the sum or all the pdf. -> pdf(e) / (pdf(e)+pdf(mu)+pdf(pi)+pdf(k)+pdf(p)).

If the denominator goes down, the probability can increase.

Subject: Re: combinations of pid algorithms
Posted by Ralf Kliemt on Thu, 17 May 2012 08:28:15 GMT

Hi.

In other words: when you increase the probability of a particle being a proton the other probabilities will drop accordingly.

You should also be really careful which PID you want to include for which particle species. Soem detectors might introduce unnecessary mix-ups. Always crosscheck with MC information to be safe.

Cheers, Ralf.