
Subject: PndBoxGenerator

Posted by [StefanoSpataro](#) on Tue, 22 May 2007 16:59:16 GMT

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After some discussions I wrote a new box generator inside pgenerators directory:
PndBoxGenerator.

PndBoxGenerator is like CbmBoxGenerator, but I put one function in order to set uniform distributions in $\cos(\theta)$, and not in θ as it is done by default.

Example:

If you want to have a unifor distribution i θ , you have to type in your simulation macro:

```
PndBoxGenerator* boxGen = new PndBoxGenerator(13, 1);
boxGen->SetPRange(1.,1.); // GeV/c
boxGen->SetPhiRange(0., 360.); // Azimuth angle range [degree]
boxGen->SetThetaRange(0., 180.); // Polar angle in lab system range [degree]
boxGen->SetXYZ(0., 0., 0.); // vertex coordinates [cm]
primGen->AddGenerator(boxGen);
```

IF you want to have a unifor distribution in $\cos(\theta)$:

```
PndBoxGenerator* boxGen = new PndBoxGenerator(13, 1);
boxGen->SetPRange(1.,1.); // GeV/c
boxGen->SetPhiRange(0., 360.); // Azimuth angle range [degree]
boxGen->SetThetaRange(0., 180.); // Polar angle in lab system range [degree]
boxGen->SetCosTheta(); // Set uniform ditribution in  $\cos(\theta)$ 
boxGen->SetXYZ(0., 0., 0.); // vertex coordinates [cm]
primGen->AddGenerator(boxGen);
```

And that's all.

Enjoy...

Ste

Subject: Re: PndBoxGenerator -> distributions uniform in $\cos(\theta)$

Posted by [StefanoSpataro](#) on Tue, 22 May 2007 17:11:57 GMT

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To show that the PndBoxGenerator works...

Comparison plots with the two methods:
RED - uniform θ

BLUE - uniform cos(theta)

Theta distributions

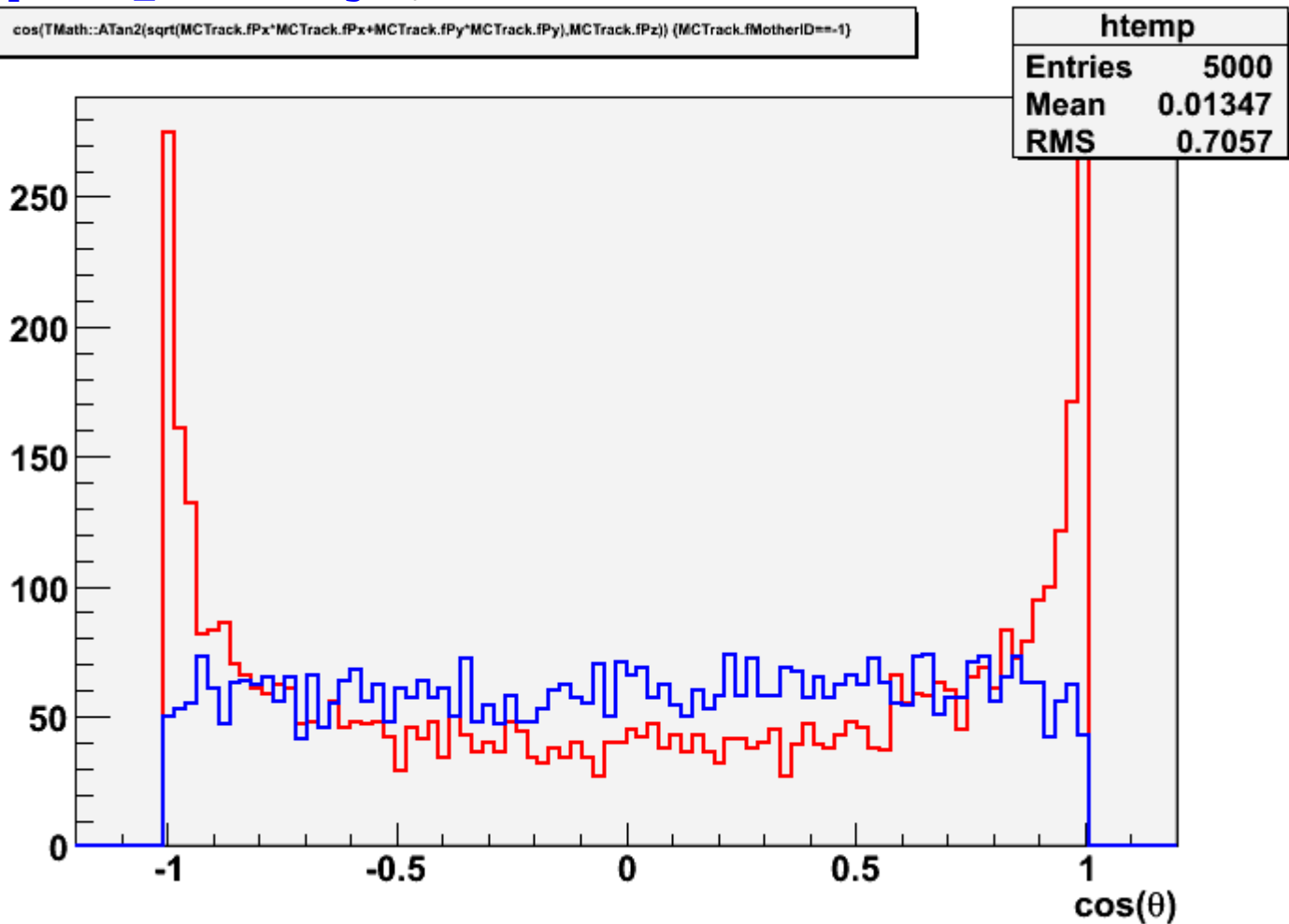
Cos(Thata) distributions

Yes, it works!

File Attachments

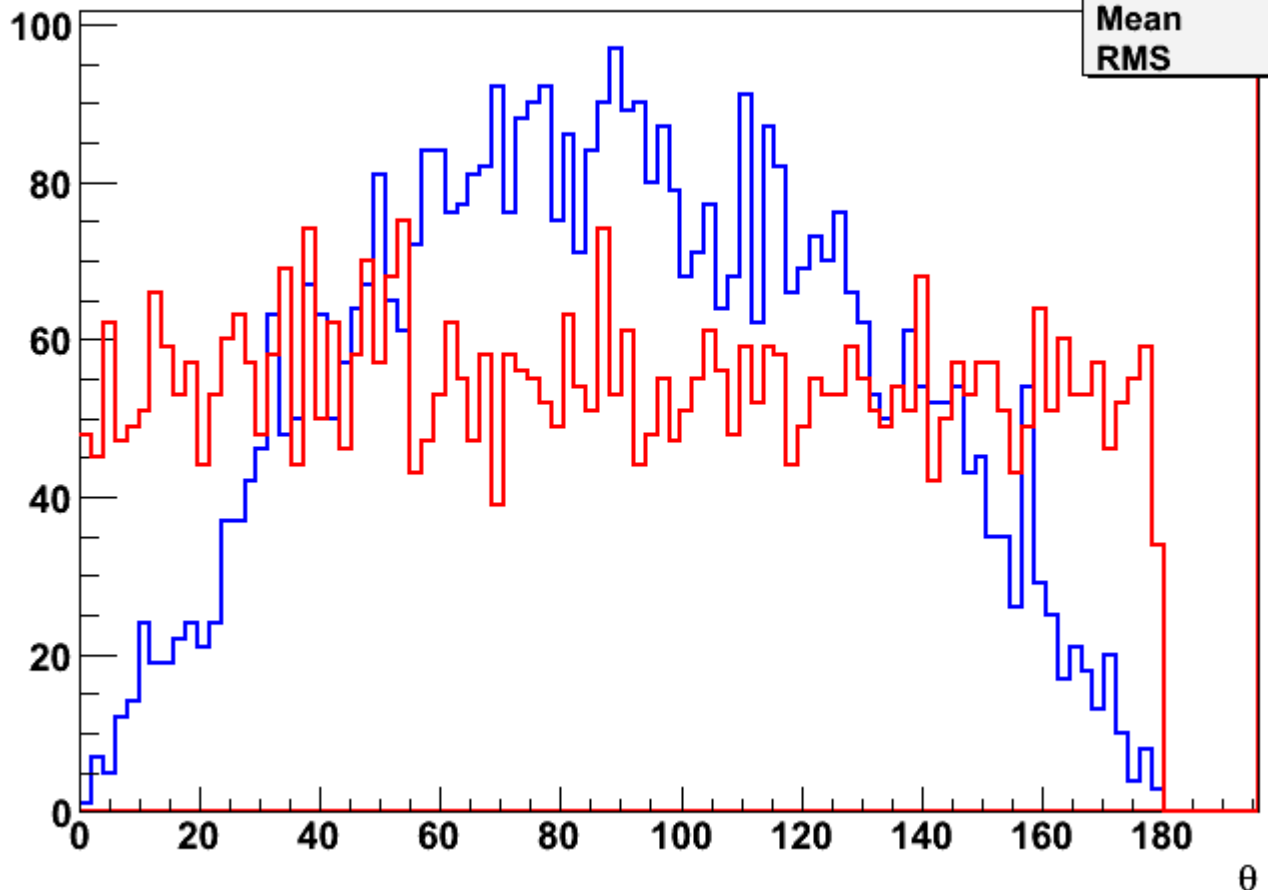
1) [pndbox_costheta.gif](#), downloaded 683 times

cos(TMATH::ATan2(sqrt(MCTrack.fPx*MCTrack.fPx+MCTrack.fPy*MCTrack.fPy),MCTrack.fPz)) (MCTrack.fMotherID==-1)



2) [pndbox_theta.gif](#), downloaded 740 times

(TMath::ATan2(sqrt(MCTrack.fPx*MCTrack.fPx+MCTrack.fPy*MCTrack.fPy),MCTrack.fPz))*TMath::RadToDeg) (MCTrack.fMotherID==1)



Subject: Re: PndBoxGenerator -> distributions uniform in 1/p
Posted by [Stefano Spataro](#) on Fri, 20 Jul 2007 11:59:10 GMT
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Hello,
I added in PndBoxGenerator a new option, in order to have distributions uniform in 1/p (sometimes it can be useful).

It works as the CosTheta function, so (example):

```
PndBoxGenerator* boxGen = new PndBoxGenerator(13, 1);  
boxGen->SetPRange(0.1,15.);  
boxGen->SetPhiRange(0., 360.);  
boxGen->SetThetaRange(1., 12.);  
boxGen->SetXYZ(0., 0., 0.);  
primGen->AddGenerator(boxGen);
```

generates particles with a uniform distribution over p in the fixed range, while if you add the boxGen->SetInverseP() function:

```
PndBoxGenerator* boxGen = new PndBoxGenerator(13, 1);  
boxGen->SetPRange(0.1,15.);
```

```
boxGen->SetInverseP();  
boxGen->SetPhiRange(0., 360.);  
boxGen->SetThetaRange(1., 12.);  
boxGen->SetXYZ(0., 0., 0.);  
primGen->AddGenerator(boxGen);
```

you will have a distribution in the same range BUT uniform in $1/p$. It works even with pt range (so uniform in $1/pt$).

Enjoy.

P.S. meanwhile I corrected a missing initialization in the constructor, ad sone for CbmBoxGenerator.
