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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  $\theta$  as it is done by default.

Example:

If you want to have a unifor distribution i  $\theta$ , 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

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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  $\theta$

BLUE - uniform cos(theta)

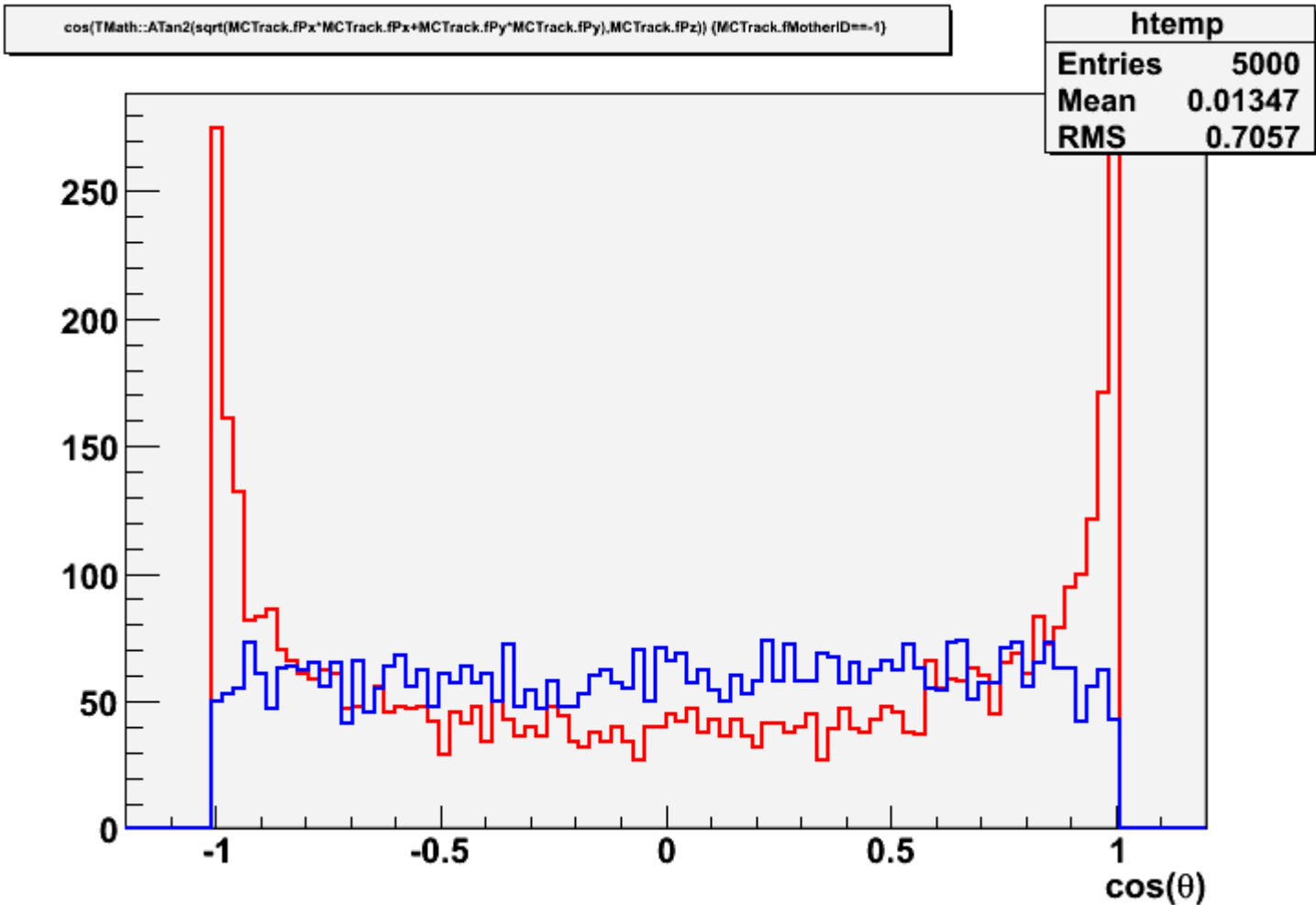
Theta distributions

Cos(Thata) distributions

Yes, it works!

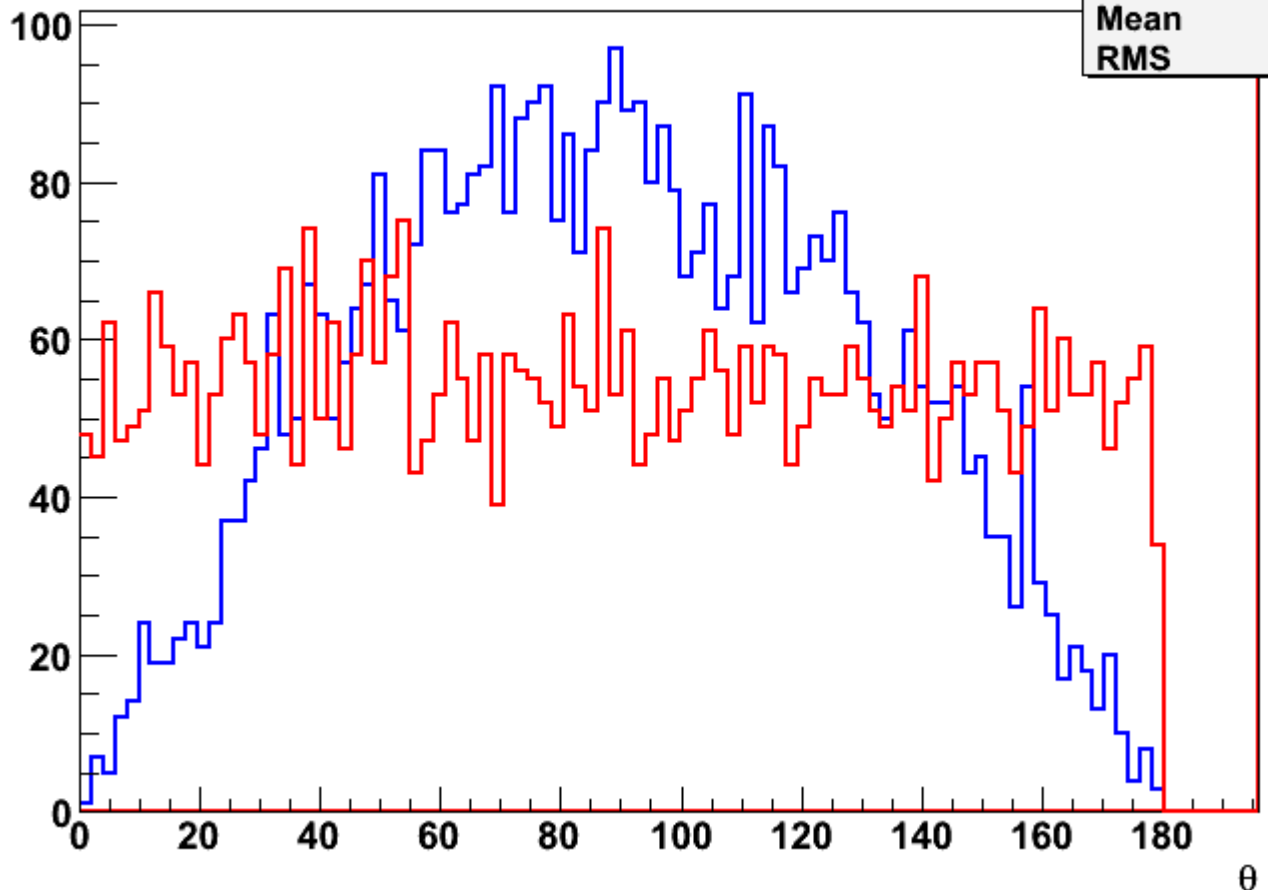
## File Attachments

1) [pndbox\\_cstheta.gif](#), downloaded 1290 times



2) [pndbox\\_theta.gif](#), downloaded 1325 times

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



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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.

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