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Subject: [FIXED] Square root of negative number in PndRiemannTrack::dY ?

Posted by [Andreas Pitka](#) on Fri, 01 Mar 2013 14:31:16 GMT

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Hi,

in the newest trunk (rev 18715) i got quite often the following error message:

```
#10 0xb6528df7 in TMath::Sqrt(double) () from
/home/pitka/uni/fairroot/sep12_src/./sep12/lib/root/libMathCore.so
#11 0xb235233d in PndRiemannTrack::dY (this=0xbfc690d0) at
/home/pitka/uni/Pandaroot/trunk/PndTools/riemannfit/PndRiemannTrack.h:57
#12 0xb1ab7c34 in PndMvdRiemannTrackFinder::FindTracks (this=0xbfc69ce8) at
/home/pitka/uni/Pandaroot/trunk/mvd/MvdTracking/PndMvdRiemannTrackFinder .cxx:225
#13 0xb1ab1b9a in PndMvdRiemannTrackFinderTask::Exec (this=0x90c17d8,
opt=0xb343f7a0 "") at
/home/pitka/uni/Pandaroot/trunk/mvd/MvdTracking/PndMvdRiemannTrackFinder Task.cxx:143
#14 0xb7176041 in TTask::ExecuteTasks(char const*) () from
/home/pitka/uni/fairroot/sep12_src/./sep12/lib/root/libCore.so.5.34
#15 0xb717668d in TTask::ExecuteTask(char const*) () from
/home/pitka/uni/fairroot/sep12_src/./sep12/lib/root/libCore.so.5.34
#16 0xb3367575 in FairRunAna::Run (this=0x8a8c1d0, Ev_start=0, Ev_end=100) at
/home/pitka/uni/Pandaroot/trunk/base/FairRunAna.cxx:54
```

Looks for me like in the PndRiemannTrack::dY function is happening a square root of a (numerically) negative number.

Best regards

Andreas

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Subject: Re: Square root of negative number in PndRiemannTrack::dY ?

Posted by [Stefano Spataro](#) on Mon, 04 Mar 2013 09:58:12 GMT

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Could you please set `Int_t iVerbose = 1;` at the beginning of your reco macro, to see which are the last messages before the crash?

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Subject: Re: Square root of negative number in PndRiemannTrack::dY ?

Posted by [Andreas Pitka](#) on Mon, 11 Mar 2013 12:42:59 GMT

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The last thing happening before the crash is the following:

```
-----
Start Plane from Points: (-1/-1/21/5/1) (-1/-1/23/2/1) (-1/-1/23/0/1)
Layer: 5 hitInLayer: 0 hitID 6 Point (-1/-1/21/5/1) -|- PndRiemannTrackFinder::CheckHitInTrack
- Hit: 6 already in track!
Layer: 6 hitInLayer: 0 hitID 1 Point (-1/-1/21/0/1) : dist 0.4 szDist 2 szChi2 3.1
```

dist larger than 0.05  
Layer: 6 hitInLayer: 1 hitID 2 Point (-1/-1/21/1/1) : dist 1.2 szDist -1.8 szChi2 1.1  
dist larger than 0.05  
Layer: 6 hitInLayer: 2 hitID 5 Point (-1/-1/21/4/1) : dist -0.66 szDist 6.6 szChi2 31  
dist larger than 0.05  
Layer: 6 hitInLayer: 3 hitID 7 Point (-1/-1/21/6/1) : dist 5.6 szDist -2.3 szChi2 2.3  
dist larger than 0.05  
Layer: 7 hitInLayer: 0 hitID 9 Point (-1/-1/21/8/1) : dist 0.44 szDist 1.3 szChi2 1.5  
dist larger than 0.05  
Layer: 8 hitInLayer: 0 hitID 4 Point (-1/-1/21/3/1) : dist 2.6 szDist -1.6 szChi2 2  
dist larger than 0.05  
Layer: 10 hitInLayer: 0 hitID 3 Point (-1/-1/21/2/1) : dist -1.8 szDist -16 szChi2 1.6e+02  
dist larger than 0.05  
Layer: 13 hitInLayer: 0 hitID 8 Point (-1/-1/21/7/1) : dist 2.4 szDist -16 szChi2 67  
dist larger than 0.05  
Layer: 15 hitInLayer: 0 hitID 11 Point (-1/-1/23/1/1) Hits: 12 11 too close 0.49  
Layer: 15 hitInLayer: 1 hitID 12 Point (-1/-1/23/2/1) -I-  
PndRiemannTrackFinder::CheckHitInTrack - Hit: 12 already in track!  
Layer: 15 hitInLayer: 2 hitID 13 Point (-1/-1/23/3/1) : dist -1.1e-14 szDist 1 szChi2 0.9  
actHit added: 13 r: 33 orig: -6.2 -34  
Hits: 13 13 too close 0  
Layer: 17 hitInLayer: 0 hitID 10 Point (-1/-1/23/0/1) -I-  
PndRiemannTrackFinder::CheckHitInTrack - Hit: 10 already in track!  
Too Close Point 11: (-1/-1/23/1/1): dist 0.45 szDist -0.48 szChi2 1.1  
dist larger than 0.05  
Track added! 6 12 10 r: 33 orig: -6.2 -34 sz-m: -0.72 sz-t: 3.9 dip: 0.81  
Hits in Track: 4  
(-1/-1/21/5/1) (-1/-1/23/2/1) (-1/-1/23/0/1) (-1/-1/23/3/1) numHits: 4

\*\*\* Break \*\*\* floating point exception

---

Subject: Re: Square root of negative number in PndRiemannTrack::dY ?  
Posted by [Stefano Spataro](#) on Mon, 11 Mar 2013 12:47:38 GMT  
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Mmmm,  
the -1 look suspicious, however we need to wait that Tobias takes a look.

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Subject: Re: Square root of negative number in PndRiemannTrack::dY ?  
Posted by [Tobias Stockmanns](#) on Wed, 13 Mar 2013 07:11:03 GMT  
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Dear Andreas,

could you please rerun the macro with the verbose level of PndRiemannTrack set to 2.

Here from India I am not able to run it by myself.

Cheers,

Tobias

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Subject: Re: Square root of negative number in PndRiemannTrack::dY ?  
Posted by [Andreas Pitka](#) on Fri, 15 Mar 2013 10:00:21 GMT  
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Hi,

the output of PndRiemannTrack before the crash is the following:

```
-----  
Start Plane from Points: (-1/-1/-1/-1/1) (-1/-1/21/8/1) (-1/-1/23/1/1)  
-l- PndRiemannTrack::addHit 0: 0 0  
-l- PndRiemannTrack::addHit 1: -2.3 4.2  
-l- PndRiemannTrack::addHit 2: -4.5 8.3  
fweight: 3.7e+04  
fav: -3 5.6 46  
sampleCov:  
1.4e+04 -2.6e+04 -4.1e+05  
-2.6e+04 4.8e+04 7.7e+05  
-4.1e+05 7.7e+05 1.2e+07  
eigenVec:  
-0.034 -0.47 -0.88  
0.062 0.88 -0.47  
1 -0.071 1.4e-05  
eigenValues: 1.2e+07 1.6e+02 -7.9e-11  
fn: -0.88 -0.47 1.4e-05  
fc: -8.3e-13  
CovNorm:  
-3.6e-14 6.7e-14 -5.4e-15  
6.7e-14 -1.2e-13 1e-14  
-5.4e-15 1e-14 -8e-16  
covAv:  
2.3e-05 0 -0.00015  
0 3.7e-06 3.3e-05  
-0.00015 3.3e-05 0.0013  
nCrn: 1.9e-05 rCnr: -1.6e-12 trCnCr: -1.5e-19  
jacRXY:  
-1 0 0 -2.6e+09  
0 -3.6e+04 0 -2.3e+09  
0 0 -3.6e+04 -1.2e+09  
temp: 3x4  
temp:  
7.2e-05 1.4e-05 -2.6e-05 2.1e-06  
8e-05 1.2e-05 -2.2e-05 1.8e-06  
4.3e-05 6.5e-06 -1.2e-05 9.8e-07  
covPlane:  
1.9e-05 -2.4e-13 4.4e-13 -3.5e-14  
-2.4e-13 -3.6e-14 6.7e-14 -5.4e-15
```

4.4e-13 6.7e-14 -1.2e-13 1e-14  
 -3.5e-14 -5.4e-15 1e-14 -8e-16  
 covRXY:  
 -5.3e+03 -4.6e+03 -2.5e+03  
 -4.6e+03 -4.1e+03 -2.2e+03  
 -2.5e+03 -2.2e+03 -1.2e+03  
 szFit() for 3 Points!  
 Point: 0: 0 0  
 Point: 1: -4.7 1.5  
 Point: 2: -9.4 2  
 t, m: 0.17 +/- 0.39 / -0.22 +/- 0.064 Chi2: 0.18  
 Layer: 0 hitInLayer: 0 hitID 0 Point (-1/-1/-1/-1/1) -|- PndRiemannTrackFinder::CheckHitInTrack  
 - Hit: 0 already in track!  
 Layer: 6 hitInLayer: 0 hitID 3 Point (-1/-1/21/2/1) ZeroPassing!  
 Layer: 6 hitInLayer: 1 hitID 4 Point (-1/-1/21/3/1) ZeroPassing!  
 Layer: 6 hitInLayer: 2 hitID 7 Point (-1/-1/21/6/1) ZeroPassing!  
 Layer: 6 hitInLayer: 3 hitID 9 Point (-1/-1/21/8/1) -|- PndRiemannTrackFinder::CheckHitInTrack  
 - Hit: 9 already in track!  
 Layer: 6 hitInLayer: 4 hitID 10 Point (-1/-1/21/9/1) Hits: 9 10 too close 0.49  
 Layer: 7 hitInLayer: 0 hitID 2 Point (-1/-1/21/1/1) szChi2Fit(hit) for 4 Points!  
 Point: 0: 0 0  
 Point: 1: -4.7 1.5  
 Point: 2: -9.4 2  
 Additional hit: 1.6 7  
 t, m: 3.4 +/- 2.1 / 0.24 +/- 0.39 Chi2: 23  
 : dist 0.82 szDist -7.2 szChi2 23  
 dist larger than 0.05  
 Layer: 9 hitInLayer: 0 hitID 5 Point (-1/-1/21/4/1) szChi2Fit(hit) for 4 Points!  
 Point: 0: 0 0  
 Point: 1: -4.7 1.5  
 Point: 2: -9.4 2  
 Additional hit: 3.7 15  
 t, m: 6.8 +/- 3.7 / 0.81 +/- 0.66 Chi2: 85  
 : dist -0.31 szDist -16 szChi2 85  
 dist larger than 0.05  
 Layer: 9 hitInLayer: 1 hitID 8 Point (-1/-1/21/7/1) szChi2Fit(hit) for 4 Points!  
 Point: 0: 0 0  
 Point: 1: -4.7 1.5  
 Point: 2: -9.4 2  
 Additional hit: -1.4 15  
 t, m: 6.6 +/- 6.1 / 0.48 +/- 1.1 Chi2: 1.4e+02  
 : dist -2.9 szDist -15 szChi2 1.4e+02  
 dist larger than 0.05  
 Layer: 12 hitInLayer: 0 hitID 6 Point (-1/-1/21/5/1) ZeroPassing!  
 Layer: 14 hitInLayer: 0 hitID 1 Point (-1/-1/21/0/1) szChi2Fit(hit) for 4 Points!  
 Point: 0: 0 0  
 Point: 1: -4.7 1.5  
 Point: 2: -9.4 2  
 Additional hit: 1.5 22  
 t, m: 10 +/- 6.6 / 1.2 +/- 1.2 Chi2: 2.3e+02  
 : dist 2.9 szDist -22 szChi2 2.3e+02  
 dist larger than 0.05

Layer: 15 hitInLayer: 0 hitID 12 Point (-1/-1/23/1/1) -l-  
 PndRiemannTrackFinder::CheckHitInTrack - Hit: 12 already in track!  
 Layer: 15 hitInLayer: 1 hitID 13 Point (-1/-1/23/2/1) szChi2Fit(hit) for 4 Points!  
 Point: 0: 0 0  
 Point: 1: -4.7 1.5  
 Point: 2: -9.4 2  
 Additional hit: -9.4 3.4  
 t, m: 0.067 +/- 0.61 / -0.28 +/- 0.086 Chi2: 0.9  
 : dist 9e-16 szDist -1.1 szChi2 0.9  
 -l- PndRiemannTrack::addHit 3: -4.5 8.3  
 fweight: 5e+04  
 fav: -3.4 6.3 57  
 sampleCov:  
 1.5e+04 -2.9e+04 -4.6e+05  
 -2.9e+04 5.3e+04 8.5e+05  
 -4.6e+05 8.5e+05 1.4e+07  
 eigenVec:  
 -0.034 -0.47 -0.88  
 0.062 0.88 -0.47  
 1 -0.071 1.4e-05  
 eigenValues: 1.4e+07 1.2e+02 -1.7e-11  
 fn: -0.88 -0.47 1.4e-05  
 fc: 9.7e-13  
 szFit() for 4 Points!  
 Point: 0: 0 0  
 Point: 1: -4.7 1.5  
 Point: 2: -9.4 2  
 Point: 3: -9.4 3.4  
 t, m: 0.067 +/- 0.61 / -0.28 +/- 0.086 Chi2: 0.9  
 actHit added: 13 r: 3.6e+04 orig: 3.1e+04 1.7e+04  
 Hits: 13 13 too close 0  
 Hits: 13 15 too close 0.3  
 Layer: 15 hitInLayer: 2 hitID 15 Point (-1/-1/23/4/1) szChi2Fit(hit) for 5 Points!  
 Point: 0: 0 0  
 Point: 1: -4.7 1.5  
 Point: 2: -9.4 2  
 Point: 3: -9.4 3.4  
 Additional hit: -9.3 3.4  
 t, m: 0.03 +/- 0.57 / -0.31 +/- 0.075 Chi2: 1.2  
 : dist -0.29 szDist -0.65 szChi2 1.2  
 dist larger than 0.05  
 Layer: 15 hitInLayer: 3 hitID 16 Point (-1/-1/23/5/1) Hits: 12 16 too close 0.3  
 Layer: 17 hitInLayer: 0 hitID 11 Point (-1/-1/23/0/1) szChi2Fit(hit) for 5 Points!  
 Point: 0: 0 0  
 Point: 1: -4.7 1.5  
 Point: 2: -9.4 2  
 Point: 3: -9.4 3.4  
 Additional hit: -12 2.7  
 t, m: 0.24 +/- 0.57 / -0.23 +/- 0.068 Chi2: 1.3  
 : dist -0.37 szDist 0.9 szChi2 1.3  
 dist larger than 0.05  
 Layer: 17 hitInLayer: 1 hitID 14 Point (-1/-1/23/3/1) szChi2Fit(hit) for 5 Points!

Point: 0: 0 0  
 Point: 1: -4.7 1.5  
 Point: 2: -9.4 2  
 Point: 3: -9.4 3.4  
 Additional hit: -12 4.5  
 t, m: -0.12 +/- 0.58 / -0.33 +/- 0.069Chi2: 1.4  
 : dist -0.07 szDist -0.94 szChi2 1.4  
 dist larger than 0.05  
 Too Close Point 15: (-1/-1/23/4/1)szChi2Fit(hit) for 5 Points!  
 Point: 0: 0 0  
 Point: 1: -4.7 1.5  
 Point: 2: -9.4 2  
 Point: 3: -9.4 3.4  
 Additional hit: -9.3 3.4  
 t, m: 0.03 +/- 0.57 / -0.31 +/- 0.075Chi2: 1.2  
 : dist -0.29 szDist -0.65 szChi2 1.2  
 dist larger than 0.05  
 Too Close Point 16: (-1/-1/23/5/1)szChi2Fit(hit) for 5 Points!  
 Point: 0: 0 0  
 Point: 1: -4.7 1.5  
 Point: 2: -9.4 2  
 Point: 3: -9.4 3.4  
 Additional hit: -9.3 2  
 t, m: 0.11 +/- 0.57 / -0.26 +/- 0.076Chi2: 1.2  
 : dist -0.29 szDist 0.67 szChi2 1.2  
 dist larger than 0.05  
 Too Close Point 10: (-1/-1/21/9/1)szChi2Fit(hit) for 5 Points!  
 Point: 0: 0 0  
 Point: 1: -4.7 1.5  
 Point: 2: -9.4 2  
 Point: 3: -9.4 3.4  
 Additional hit: -4.7 1.1  
 t, m: -0.028 +/- 0.49 / -0.29 +/- 0.073Chi2: 0.99  
 : dist -0.15 szDist 0.33 szChi2 0.99  
 dist larger than 0.05  
 fweight: 5e+04  
 fav: -3.4 6.3 57  
 sampleCov:  
 1.5e+04 -2.9e+04 -4.6e+05  
 -2.9e+04 5.3e+04 8.5e+05  
 -4.6e+05 8.5e+05 1.4e+07  
 eigenVec:  
 -0.034 -0.47 -0.88  
 0.062 0.88 -0.47  
 1 -0.071 1.4e-05  
 eigenValues: 1.4e+07 1.2e+02 -1.7e-11  
 fn: -0.88 -0.47 1.4e-05  
 fc: 9.7e-13  
 CovNorm:  
 -7.9e-15 1.5e-14 -1.2e-15  
 1.5e-14 -2.7e-14 2.2e-15  
 -1.2e-15 2.2e-15 -1.8e-16

covAv:  
1.8e-05 0 -0.00013  
0 2.1e-06 2e-05  
-0.00013 2e-05 0.0012  
nCrn: 1.4e-05 rCnr: -3.5e-13 trCnCr: -2.2e-20  
jacRXY:  
-1 0 0 -2.6e+09  
0 -3.6e+04 0 -2.3e+09  
0 0 -3.6e+04 -1.2e+09  
temp: 3x4  
temp:  
5.7e-06 3e-06 -5.6e-06 4.5e-07  
1.8e-05 2.7e-06 -4.9e-06 4e-07  
9.5e-06 1.4e-06 -2.7e-06 2.1e-07  
covPlane:  
1.4e-05 -5.3e-14 9.7e-14 -7.8e-15  
-5.3e-14 -7.9e-15 1.5e-14 -1.2e-15  
9.7e-14 1.5e-14 -2.7e-14 2.2e-15  
-7.8e-15 -1.2e-15 2.2e-15 -1.8e-16  
covRXY:  
-1.2e+03 -1e+03 -5.5e+02  
-1e+03 -9e+02 -4.8e+02  
-5.5e+02 -4.8e+02 -2.6e+02  
szFit() for 4 Points!  
Point: 0: 0 0  
Point: 1: -4.7 1.5  
Point: 2: -9.4 2  
Point: 3: -9.4 3.4  
t, m: 0.067 +/- 0.61 / -0.28 +/- 0.086 Chi2: 0.9  
Track added! 0 9 12 r: 3.6e+04 orig: 3.1e+04 1.7e+04 sz-m: -0.28 sz-t: 0.067 dip: 0.96  
Hits in Track: 4  
(-1/-1/-1/-1/1) (-1/-1/21/8/1) (-1/-1/23/1/1) (-1/-1/23/2/1) numHits: 4

\*\*\* Break \*\*\* floating point exception

Best regards

Andreas

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Subject: Re: Square root of negative number in PndRiemannTrack::dY ?  
Posted by [Tobias Stockmanns](#) on Wed, 20 Mar 2013 13:07:39 GMT

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Hi Andreas,

can you please test if it is still crashing with the latest SVN version?

Thank you.

Tobias

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Subject: Re: Square root of negative number in PndRiemannTrack::dY ?

Posted by [Andreas Pitka](#) on Thu, 21 Mar 2013 11:52:48 GMT

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Hi,

i tried it with revision 18898 and there exactly the same error is happening.

Best regards

Andreas

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Subject: Re: Square root of negative number in PndRiemannTrack::dY ?

Posted by [Tobias Stockmanns](#) on Thu, 21 Mar 2013 11:57:16 GMT

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Hi Andreas,

the actual trunk version is 18897 (according to trac). Are you sure that you have revision 18898?

Cheers,

Tobias

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Subject: Re: Square root of negative number in PndRiemannTrack::dY ?

Posted by [Andreas Pitka](#) on Thu, 21 Mar 2013 12:07:46 GMT

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Hi,

the newest version seems to be already 18899.

<https://subversion.gsi.de/trac/fairroot/changeset/18899/>

Best regards

Andreas

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Subject: Re: Square root of negative number in PndRiemannTrack::dY ?

Posted by [Stefano Spataro](#) on Fri, 03 May 2013 10:16:21 GMT

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Does it work now?

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Subject: Re: Square root of negative number in PndRiemannTrack::dY ?

Posted by [Andreas Pitka](#) on Thu, 16 May 2013 10:17:00 GMT

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I have to admit the problem was caused by using a slightly too old version of the simulation macros in "macro/run".

With the current macros it seems not to appear.

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