### ARM post-submit SIMD sqrt/invsqrt test failure

10/05/2017 12:15 PM - Aleksei Iupinov

<table>
<thead>
<tr>
<th>Status</th>
<th>Closed</th>
</tr>
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<tbody>
<tr>
<td>Priority</td>
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</tr>
<tr>
<td>Assignee</td>
<td></td>
</tr>
<tr>
<td>Category</td>
<td>core library</td>
</tr>
<tr>
<td>Target version</td>
<td>2018</td>
</tr>
<tr>
<td>Affected version</td>
<td>2016</td>
</tr>
<tr>
<td>Difficulty</td>
<td>uncategorized</td>
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</tbody>
</table>

#### Description
This has been broken for a while, since at least 18th September, where the Jenkins history stops. I'm not sure whether I missed some discussion on this.

http://jenkins.gromacs.org/view/Post-submit/job/Matrix_PostSubmit_master/211/OPTIONS=gcc-4.8%20simd=ARM_NEON%20release-with-assert%20host=bs_jetson_tk1,label=bs_jetson_tk1/testReport/

```
/home/jenkins/workspace/Matrix_PostSubmit_master/2ef28f92/gromacs/src/gromacs/simd/tests/simd_math.cpp:690
Failing SIMD math function ulp comparison between refSqrt and sqrtSingleAccuracy
Requested ulp tolerance: 16
Requested abs tolerance: 0
Denormals can be 0: false
Largest Ulp difference occurs for x=2.6848277890087878e+38
Ref values: 1.6385444545141146e+19
SIMD values: 3.6968949829456626e+19
Ulp diff.: 10280507
```

#### Associated revisions

**Revision 04548b34** - 10/11/2017 10:45 AM - Berk Hess
Disable ARM Neon native rsqrt iteration

Fixes #2261

Change-Id: lebcdb3f85506b8159c06d9a9a5cb5f5c81ba11c9

**History**

**#1 - 10/06/2017 11:19 AM - Gerrit Code Review Bot**
Gerrit received a related patchset '1' for Issue #2261.
Uploader: Berk Hess ([hess@kth.se](mailto:))
Change-Id: gromacs~release-2016~Iae2f1595b68f42d056eda4c90202420796e9beb5
Gerrit URL: [https://gerrit.gromacs.org/7004](https://gerrit.gromacs.org/7004)

**#2 - 10/06/2017 11:22 AM - Berk Hess**
- Status changed from New to Fix uploaded
- Target version set to 2016.5
- Affected version changed from git master to 2016

Without NDEBUG maskzRsqrt does reciprocal instead of invsqrt, and thus all invsqrt and sqrt SIMD functions are incorrect. In full release mode it should be correct.

**#3 - 10/06/2017 11:24 AM - Gerrit Code Review Bot**
Gerrit received a related DRAFT patchset '1' for Issue #2261.
Uploader: Berk Hess ([hess@kth.se](mailto:))
Correction it does (masked) identity instead of invsqr.

Another correction: the issue is not in mask2Invsqrt, since all invsqrt functions (and sqrtUnsafe which uses invsqr) fail.

Mark said the result only deviates for values close to float_max. Since the error is a factor 1.5 for float_max and you need to put the squared approximation into the arm iterator function, what likely happens is that (approx_sqrt(float_max))^2 > float_max, which is inf, which in turn gives 0 at the result of the arm iterator function. This is then "corrected" in follow-up iterations.

The solution is to disable the hardware iterator function and use the GROMACS version. Since this only affects arguments very close to float_max, it does not necessarily need to be fixed in the release branch.

post-submit testing now works