Check-in

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1 Updates on previous goals

- Finish debugging
- Design and add unit testing
- Put efforts on gtest+MPI
- Help Marissa

2 Progress up to now

2.1 Debugging progress and testing

During last week, the compilation errors were finally resolved. The final efforts was actually fighting on one single linker error from the reimplementation of material properties due to lack of understanding `inline`. What happened was I added `inline` to small functions like the interface functions while those functions, following Google Style's requirement were set to be `const` in the reimplementation.

I am now fighting with runtime error and due to the restructuring. These will be eliminated and unit testing will be set up.

2.2 Gtest+MPI

Part of the efforts was to understand what exactly we need to do to enable the MPI-gtest combo. I talked to Josh and he had no idea. I finally got through this in terms of understanding.

Basically what's happening is by default, gtest environment class ::testing::Environment does not provide any functionality to initialize and terminate MPI. What we really need to do is to provide a child class and override the `SetUp()` class to initialize MPI using `MPI_Init` and override `TearDown()` class to Finalize MPI using `MPI_Finalize` from STL.

The goodness is other than overriding functions from ::testing::Environment everything will be almost the same.

The code snippet has been provided to Josh so he can include it when he separates the testing main function from the BART main function for better understandability/readability. Hopefully, this will be reflected in the PR.

2.3 Marissa

Several meetings and online chatting were scheduled to debug the code. Two-grid part of the code, from today, finally gives consistent result with NDA.

Through the brain damaging process, the difference between NDA and SAAF is reduced by changing to using Gauss node

The other thing is Marissa wants to do a more realistic code. So some efforts were put on getting familiar with my previous NJOY scripts and adapt them to generating the desirable cross sections. And it finally generate cross sections!

At the same time, I suggest Marissa use moderator cross section from C5G7 and produce an artificial absorber by lowering scattering cross sections by 20% to be used in the shielding test. We will see how this works too.

3 Goals/Things will be going on

- Get the runtime error done so BART will be at where we restart
- Continue to add unit tests.
- Get gtest to work with MPI (with Josh).
- See if there's anything I can help for Marissa