Minutes of the ABP Computing Working Group meeting

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General Information

- Issues encountered in the usage of the HTCondor are being collected on a wiki page hosted on the ABP-CWG website. Experts from IT will join the next meeting on the 31 August to discuss this topic.

MAPCLASS

The MapClass code was presented by E. Marin. Slides are available here.

- Two codes exist: MapClass written in Python in 2006 and MapClass2 written in C++ in 2012.
- They are used for lattice design, to optimize the non-linear aberrations in beam lines using 1st and 2rd order moments at a given location as a figure of merit.
- MapClass imports the coefficients from MADX-PTC to produce a transfer map, MapClass2 can also produce the transfer map from a twiss file.
- Order-by-order analysis of the map provides a thorough and insightful understanding of the high order aberrations at any given location.
- Collective effects, acceleration/deceleration and synchrotron radiation are not included in MapClass. MapClass2 can take into account synchrotron radiation (bends and quads) when building the map from twiss.
- MapClass has been used to design Beam Delivery Systems for linear colliders (CLIC, ILC, ATF2) and to optimized the insertion regions of circular colliders (CEPC, LHC).
- MapClass was originally programmed in Python using the Object Oriented Programming.
- Python 2.6 or higher are required together with MADX-PTC, Numpy package, argparse , OrderedDict, unittest2.
- The code can be used on Windows, Linux and MacOS X.
- The computational time is heavily impacted by the order of the momenta.
- In 2013 the C++ version was implemented to speed up the computation. This approach was very successful.
- Parallelization is included and includes two faces: small maps are treated using multi-core processors and large maps are treated by GPUs. The obtained speed-up is a factor of two from 12-order maps.
- MapClass is hosted on github at https://github.com/pylhc/MapClass2.
- The code is routinely run on lxbatch using afs for storage.