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# MCPLOTS - a new tool for tuning and validation of Monte Carlo generators

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In this paper we present a new tool for tuning and validation of Monte Carlo (MC) generators, essential in order to have predictive power in the area of high-energy physics (HEP) experiments. With the first year of LHC data being now analyzed, the need for reliable MC generators is very clear. The tool, called MCPLOTS, is composed of a browsable repository of plots comparing HEP event generators to a wide variety of available experimental data, an underlying database, as well as a machinery for performing new analysis and validation and for producing new plots.

The browsable repository is the user entry point to the tool. It contains menus organized according to specific process types and observables. The plots show a comparison of different generators/tunes and experimental data. In a separate section, different versions of the same generator are compared to each other, to track the evolution of the implemented models. Future plans include an interactive service, where users can define and produce their comparisons and upload their own data plots for validation.

The underlying database uses MySQL technology and it holds histograms with the associated metadata (beam type and energy, generator version, tune, etc). A PHP-based interface is used for the communication between the web page and the database. The use of a database allows for making specific queries to extract histograms for different ways of presentation (observables view, validation view). Links to the MC steering files and references to experimental data are also stored in the database which allows full reproducibility of results.

The machinery used to produce these plots is under continuous development and is touching different areas of computing, such as GRID, CLOUD or voluntary computing. The main MC analysis tool is Rivet. It allows to process the MC output in a way that the direct comparison to experimental published data is possible. Reliable comparisons sometimes mandate very large statistics of MC data. For this purpose interfaces to different generalized production farms have been implemented. In particular, the use of the CERN batch system and voluntary computing (LHC@home 2.0/BOINC project), have been envisaged.

After a year of being publicly available, the MCPLOTS tool has gained a lot of interest and positive feedback. It is constantly being developed and improved and its role for the LHC experiments is growing. The browsable repository can be accessed through http://mcplots.cern.ch.

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