Rivet monthly dev meeting

6 November 2024

Recent activity / TODOs

- **Rivet 4.0.2 and YODA 2.0.2 released!**
  - ~30 analysis routines, plotting improvements, bugfixes
  - Still no urgency/calls for a 3.1.x final update
  - Dockers not yet built due to crashing issue: time to test the CI/multiarch
- **Multi-energy merging**
  - CG/AB discussed ⇒ implemented all-histo booking for the first batch of these analyses
  - Other “magic” mechanisms not workable, better to devolve this to analysis QA
- **COST network application submitted**
  - 69 co-applicants, wait and see!
- **Publications**
  - YODA paper resubmitted to arXiv, response to SciPost Codebases comments tomorrow
  - Benchmarking shows dominance by bin-searching. Unclear how/if Boost outperform?
- **Neglected TODOs**
  - Still there: CG/AB ⇒ test multi-arch Dockers + migrate YODA coverage work to Rivet
  - Fix the web page!

Major features ideas

- **deltaR jet-tagging**
  - ATLAS report/discussion about matching new (?) truth-label definition: includes a dR < 0.3 cut not in Rivet's definition. Possible but awkward
  - AB has added an optional dRmax variable to Jet::bTags() etc. for 4.1.0
  - Ideally, also need to add a pure-dR labelling to FastJet/JetFinder (though min impact)

- **SimpleAnalysis wrapper / easy-analysis API**
  - Want (again) to encourage search analysis preservation — esp. in context of ATLAS SUSY group redistribution, EXO leadership, and RECAST deprioritisation
  - How plausible to make an Analysis subclass roughly API-compatible with SimpleAnalysis routines? Generally useful to also reduce entry barrier for searches with predefined "reco level" objects, etc.
  - Clustered jets & overlap removal are blockers/awkwardnesses for lots of analyses

- **YODA: H5 interface, histos with intrinsic multiweight support, …**

Major features ideas

- **Improved primary-particle definitions**
  - Requires predicate functions for definitions of primariness
    ⇒ technical issue: std::functions are not comparable… work-arounds? Key to caching
  - Default FS behaviour to move away from get status = 1: semantic change
  - Database for historic $c\tau_0$ tests; particle-specific $c\tau$ or position for BSM LLPs
    ⇒ AB: discuss with *Louie/Sihyun* re. fiducial LLP definitions (also e.g. LHCb)
  - *Careful* rollout and regression testing needed
  - First stage: just test and warn if particles significantly displaced: also needs care!
  - https://arxiv.org/abs/2407.18710

- **Flavour-sensitive kT clustering in LeptonFinder**
  - More prototyping by AB: awkward in vanilla FJ, but QCDAware plugin is ideal. Might want to extend to include charge terms in distance, longer-term — cf. Sherpa.

Meetings, coordination, etc.

- **Rivet & Contur tutorials**
  - Martin H + Peng ran an under-advertised tutorial in Oct ATLAS week
  - Need clearer PC scope and much better advertising next time…
  - But good to be back. Thank you! Now other experiments / next opportunities?
  - ATLAS UK in Jan?

- **In-person events**
  - **CEDAR-Key4HEP meeting at DESY, 5-6 Dec**
    - Important to engage, to avoid reinventing the wheel
    - Key4HEP/EDM4HEP tools evolved in LC, but FCC have coalesced around them
  - **Les Houches 2025**
  - **MCnet summer school 2025…** somewhere in England/Scotland
  - **MIAPbP 2025:** https://www.munich-iapbp.de/activities/activities-2025/event-generators
    - Reg deadline passed (but will be moved back): who is going in weeks 1-2?

AOB

- **Filtering to show only most-crucial analyses on coverage pages?**
  ⇒ maybe? Subjective, risks constructive avoidance of “second class” analyses
- **Request for ntupling, specifically EDM4HEP format**
  AB wrapper analysis base-class half-written; format of FCCAnalysis not 100% clear. Example requested. EDM4HEP could do with modernisation ⇒ MCnet input
- **heprivet.org web page (and YODA, LHAPDF…)**
  Needs some imminent person-power to finish. Current developments ongoing (through GSoC and between CG, Max Knobbe and AB for LHAPDF visualisation and data submission). Tech & design for doc/test/coverage data passing can be reused

BACKUP

Other features ideas

- **HI framework and hadron decays**
  - Scatters→Estimates; currently works; could bet better, e.g. preserve errs
  - Test impact-param and secondary-vertex tools ⇒ LHCb testing
  - HI jet subtraction mechanism?
  - Post-processing script system: auto-discovery and running of fits etc.?
  - …