Transform Domain Morphological Filters

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Propositions

accompanying the dissertation

Transform Domain Morphological Filters

1. Transform domains allow views of connectivity from different perspectives.
2. Graph-based attribute-space morphological attribute-filters are a computational efficient replacement for the more traditional methods in particle-track reconstruction, when it comes to online data reduction.
3. Graph-based transform domain morphological attribute filters are intuitive and powerful tools which facilitate uniform processing of data as long as a neighbourhood relation is defined between the measurement point.
4. Lowering computational complexity using methods such as those presented in this thesis is one of the key requirements to perform future experiments using massive multi-sensor detection systems.
5. Morphological connected attribute-filters are powerful tools to reconstruct structures and patterns in multi-dimensional data sets as is shown when reconstructing z-coordinates of the particle paths using exclusively the detector geometry.
6. Connected filtering in the wavelet domain allows context-based wavelet shrinkage.
7. Unmaintainable legacy code is becoming a threat to scientific research, specially in those fields of science which were early adopters of computational science.
8. In deep-learning research error bounds and significance tests on results are often omitted, with the excuse that it would take too much time to obtain or perform them. The authors of such reports should talk to researchers in particle physics.
9. Human rights are universally defined and agreed upon. Yet their realisation is too often weighted at least by skin colour, gender and place of birth.
10. Scientific research should be considered as a cultural heritage, like a work of art, and not be judged only by its applicability.
11. As efficient computing equals green-computing, the usage of interpreted languages like Python should be limited to an absolute minimum.