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Jet tagging with deep sets of subjets

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We introduce a complete basis of subjets for machine learning-based jet tagging. The subjets are obtained with (i) a fixed radius or (ii) the clustering is performed until a fixed number of subjets is obtained.

For nonzero values of the subjet radius, the resulting classifier is Infrared-Collinear (IRC) safe. By lowering the subjet radius, we can increase the sensitivity to nonperturbative physics. In the limit of a vanishing subjet radius, the exclusive subjet basis approximates deep sets/particle flow networks (IRC unsafe). The basis introduced here is thus ideally suited to quantify the information content of jets at the boundary of perturbative vs. nonperturbative physics.

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