

QCD HW V

1. Demonstrate that both the cone algorithm (without seeds) and the k_T algorithm are IRS at NLO in pQCD, *i.e.*, show that the “found” jet will have the same properties whether it contains a single parton or a pair of collinear partons with the same total momentum. Also show that the jet is unchanged by the emission of a (vanishingly) soft gluon. This does not require a slick argument. The idea is just to give you the opportunity to think through what it takes to be IRS.
2. Use the Snowmass definition of the iterative cone algorithm (*i.e.*, E_T weighting instead of 4-vector addition) to show that the 2-parton phase space splits up as indicated in the figure in the Lecture. While this is really a 2-D problem in (y, ϕ) , the fact that there are only 2 partons, which effectively lie in a plane, means we can think of it as a 1-D problem, *i.e.*, just the separation d in that plane.

