WG 5: M C TOOLS

PROGRESS WITH NLOLIB

Implementation of JetViP

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The NLOLIB Project

A Framework for NLO Calculations

-- Authors: T. Hadig and K. Rabbertz

-- Aim: To provide a common interface between NLO calculations on the one hand side and PDFs, couplings and HzTool on the other.

-- Status: Implementation ready for

--> Disent: ep NLO QCD calculation for jet physics

--> Disaster++:   ep NLO QCD calculation for jet physics in C++

--> MepJet: ep NLO QCD calculation for jet physics

--> RacoonWW: ee 4f production in NLO

-- Idea now: Implement more programs, also for the pp case:

--> JetViP: ep,ee NLO QCD including resolved photons

(--> M. Klasen's NLO program for jet physics in pp)

The JetViP Program

... and its introduction into NLOLIB

-- Author: B. Poetter

-- Aim:

--> NLO calculation for inclusive and dijets in ep,e-gamma collisions

--> including resolved contributions
(important at low photon virtualities at HERA!)

--> Some known problems concerning dependence on phase-space
slicing parameter and inconsistencies in ME – propagator matching

-- JetViP uses Vegas for the phase-space integration.

Status:

-- first introduction of the ep case into NLOLIB is ready.

-- however: this is only a first shot because ...

Problems with PDFs, couplings

... all programs should use one common source!

-- Problem: Output of JetViP event routine. Already performed are

--> summations of all flavours

--> convolutions with proton (and photon) PDF

--> multiplication with correct orders of couplings (with non-standard implementations)

Things are done veeeeery deep down in the code ...

==> in order to use NLOLIB PDFs and couplings need to

--> tear appart all contributions to the event weights,

--> single out the PDFs and couplings,

--> reassemble the weights for each (proton PDF) flavour

--> and pass 11/13 weights to the NLOLIB WSUM routine which multiplies with PDFs and the correct order of couplings.

Additional Complication

use of two PDFs in DIS: proton and photon

-- NLOLIB currently only designed for one PDF to be convoluted with the weights

=> for the time being try to use JetViPs photon PDF when necessary. Need to think of better solution for this.

Status:

-- successfully took apart all two-body contributions for ep, currently working on the three-body parts. Need constant cross-checking with stand-alone version of JetViP.

-- ee case not yet started. Hope: More or less straight forward after ep is finished (but I never really looked into the specific terms).

First Efforts for pp

M. Klasen's pp program

-- Program is basis for the JetViP development --> structure should be similar and easy to understand after JetViP.

-- Klasen ~promised to send a working stable version soon.

Summary

Progress with NLOLIB

-- Authors keep working and improving NLOLIB structure

-- JetViP should soon be ready for the pe case.

-- JetViP ee case some way ahead.

-- First pp program also introduced soon? I am thinking about volunteering -- if I have the feeling that this is something that is appreciated by more people than only me ...