

N3LL convolution tables - prefactors

Note about the computation of the prefactors for the N3LL convolution tables. Those prefactors are read by `tables/N3LL/IncludePrefactors.py` from the file `tables/N3LL/FiducialCrossSections.yaml` and put into the header of the N3LL tables. The experiments for which the observable is

$$\frac{1}{\sigma_{\text{fid}}} \frac{d\sigma}{dq_T}$$

and thus need the prefactor in the convolution table are the following.

Tevatron

D0 RunII


Result from DY@NNLO for D0 RunII with MHT2014nnlo68cl at NNLO is:

$$\sigma_{\text{fid}} = 253573.16201836051 \pm 191.21956302108154 \text{ fb}$$

The integration interval in y is fully specified in the data file:

```
1 | - {name: y, low: -3.4, high: 3.4, integrate: true}
```

so there is no need to multiply by 2 the final result.

 So the prefactor for the table at N3LL is:

$$\frac{1}{253.573} = 0.00394$$

0.00394

LHC

ATLAS 7 TeV


ATLAS 7TeV_y_0_1

Result from DY@NNLO for ATLAS 7 TeV with

$$0 < |y| < 1$$

at NNLO is:

$$\sigma_{\text{fid}} = 253781.71862319650 \pm 4901.5063557353706 \text{ fb}$$

 So the prefactor for the table at N3LL is:

$$\frac{2}{253.781} = 0.00788$$

0.00788

ATLAS 7TeV_y_1_2

Result from DY@NNLO (Fulvio, cluster) for ATLAS 7 TeV with
 $1 < |y| < 2$

🌸 the prefactor for the table at N3LL is:

$$\frac{2}{181.466} = 0.01102$$

0.01102

ATLAS 7TeV_y_2_2.4

Result from DY@NNLO (Fulvio, cluster) for ATLAS 7 TeV with
 $2 < |y| < 2.4$

🌸 the prefactor for the table at N3LL is:

$$\frac{2}{17.104} = 0.1169$$

0.1169

1.

ATLAS 8 TeV

For ATLAS 8 TeV all the fiducial cross section come from DY@NNLO (Fulvio computed them on the cluster Neowulf), with NNPDF30nnlo_118 .

ATLAS 8 TeV y_0_0.4

🌸 The prefactor for the table at N3LL is:

0.01756

ATLAS 8 TeV y_0.4_0.8

🌸 The prefactor for the table at N3LL is:

0.01768

ATLAS 8 TeV y_0.8_1.2

🌸 The prefactor for the table at N3LL is:

0.01829

ATLAS 8 TeV y_1.2_1.6

🌸 The prefactor for the table at N3LL is:

0.02175

ATLAS 8 TeV y_1.6_2

🌸 The prefactor for the table at N3LL is:

0.0332984

ATLAS 8 TeV y_2_2.4

🌸 The prefactor for the table at N3LL is:

0.0990859

CMS

CMS 7TeV

Result from DY@NNLO for CMS 7 TeV at NNLO with the cuts:

```
1 c$$$C      Cuts for Z production (CMS)
2 if(m34.lt.60d0.or.m34.gt.120d0) cuts=.true.
3
4 if(ptmin.lt.20d0) cuts=.true.
5
6 if(dabs(eta3).gt.2.1d0) cuts=.true.
7 if(dabs(eta4).gt.2.1d0) cuts=.true.
8
9 if(dabs(y34).gt.2.1d0) cuts=.true.
```

is:

Cross section is 398853.294 +/- 2137.997 fb

🌸 So the prefactor for the table at N3LL is:

$$\frac{2}{398.853} = 0.005014$$

0.005014

CMS 8TeV

Cuts applied in DY@NNLO for CMS 8 TeV at NNLO with the cuts:

```
1      if(m34.lt.60d0.or.m34.gt.120d0) cuts=.true.
2
3      if(ptmin.lt.15d0) cuts=.true. !!for 8 TeV
4
5      if(dabs(eta3).gt.2.1d0) cuts=.true.
```

```
6 | if(dabs(eta4).gt.2.1d0) cuts=.true.  
7 |  
8 | if(dabs(y34).gt.2.1d0) cuts=.true.
```

Cross section is 473411.372 +/- 3035.719 fb



So the prefactor for the table at N3LL

$$\frac{2}{473.411} = 0.004225$$

0.004225