



News from QCDNUM

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xFitter users meeting

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Recent QCDNUM release history

- QCDNUM-17-01-10 released 27 Oct 2015
 - Can build library with `autotools`
 - Small bug fix in `PDFEXT` routine
- QCDNUM-17-01-11 released 13 Nov 2015
 - Can specify the number of perturbative terms in `EVDGLAP` (2/3/4 at LO/NLO/NNLO in QCD-QED)
- QCDNUM-17-01-12 released 26 Feb 2016
 - Bug fix in NLO time-like singlet evolution
 - Put NLO matching conditions in time-like evolution
 - Also update release 17-00-06 → 17-00-07

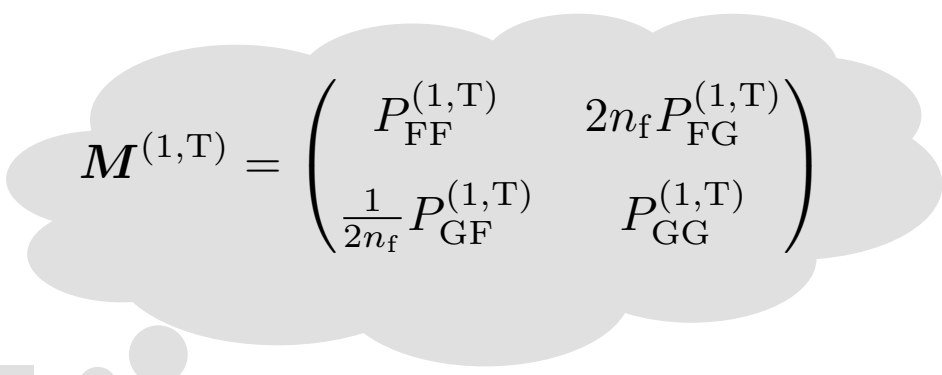
Splitting function matrices for singlet evolution

- The matrices for space-like evolution were OK

$$M^{(0,S)} = \begin{pmatrix} P_{FF}^{(0)} & P_{GF}^{(0)} \\ P_{FG}^{(0)} & P_{GG}^{(0)} \end{pmatrix} \quad M^{(1,S)} = \begin{pmatrix} P_{FF}^{(1,S)} & P_{GF}^{(1,S)} \\ P_{FG}^{(1,S)} & P_{GG}^{(1,S)} \end{pmatrix}$$

- Those for the time-like evolution should be transposed

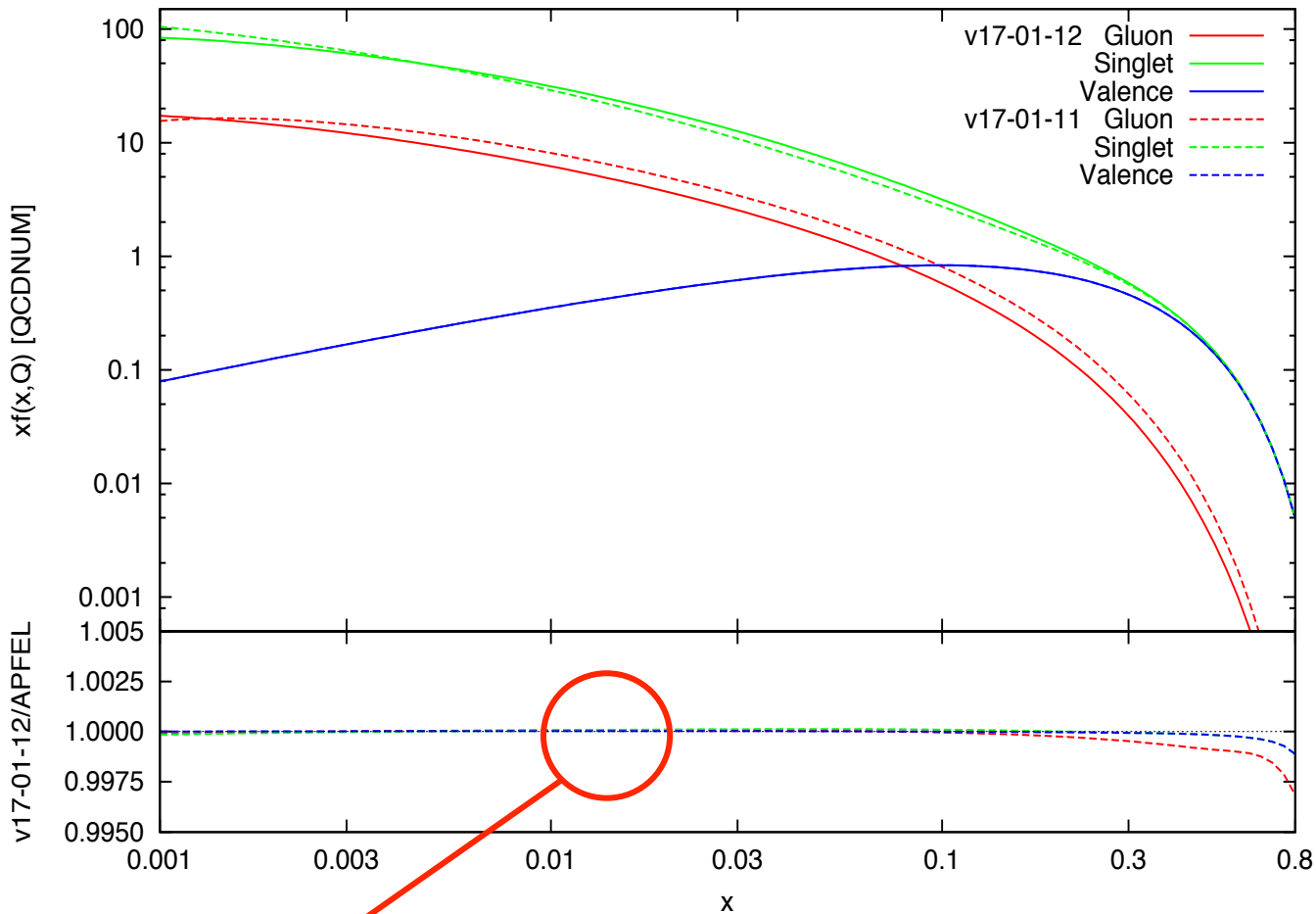
$$M^{(0,T)} = \begin{pmatrix} P_{FF}^{(0)} & 2n_f P_{FG}^{(0)} \\ \frac{1}{2n_f} P_{GF}^{(0)} & P_{GG}^{(0)} \end{pmatrix}$$


$$M^{(1,T)} = \begin{pmatrix} P_{FF}^{(1,T)} & 2n_f P_{FG}^{(1,T)} \\ \frac{1}{2n_f} P_{GF}^{(1,T)} & P_{GG}^{(1,T)} \end{pmatrix}$$

**QCDNUM did not
transpose this matrix**

V. Bertone et al, JHEP 1503 ,046 (2015)
M. Botje, arXiv:1602.08383 (2016)

QCDNUM vs. APFEL, time-like evolution at NLO in the VFNS, $Q = 100 \text{ GeV}$



Comparison
of NLO
time-like
evolution

Excellent agreement between QCDNUM and APFEL after the bug fix

My thanks to Valerio Bertone for help in sorting this out

QCDNUM joblist beyond 17-01-12

- Fixup interpolation routines and make them faster
- Cleanup code to have one evolution routine (now there are two)
- Upgrade polarised and time-like evolution to NNLO
- VFNS evolution starting above charm threshold (intrinsic charm)
- C++ interface
- Re-enable cuts
- Toolbox improvements
- ...

You are welcome to add to this list or
make suggestions to prioritise it