Wilson Expansion of QCD Propagators at Three Loops

The attached files contain the results presented in TTP09-40 in computer readable form for the case of a SU(`nc`) gauge group and `nf` quark flavors. Each result is encompassed in a `FORM`-type fold, which has the following format:
`*--#[` *name* `:`
expression
`*--#]` *name* `:`

The respective files contain the following data:

- `AD.frm`: The anomalous dimensions γ_{A^2}, γ_{A^2,m^2}, $\gamma_{\bar\psi\psi,m^3}$.
- `RC.frm`: The corresponding renormalization constants
- `c_ren.frm`: The renormalized coefficient functions in the OPEs of the gluon, ghost and quark dressing functions.
- `c_bare.frm`: The bare coefficient functions.

The same files with the suffix `_landau` contain the corresponding results in Landau gauge. Aside from one additional order in γ_{A^2} and Z_{A^2} and setting $\xi_{\text{Landau}} = 0$ their contents are the same. Note that we use euclidean momenta and the euclidean definition of $A^2 = -A^a_\mu A^{a\,\mu}$.

We use the following notation:

`as`	`lmu2Q`	`xil`	`eQ1`	`ng`	`z2, z3, ...`	`Pi`	`ep`
$\frac{\alpha_s}{\pi}$	$\ln\frac{\mu^2}{Q^2}$	ξ_{Landau}	$\left(\frac{\mu^2}{Q^2}\right)^\epsilon$	$n_c^2 - 1 = 8$	$\zeta_2, \zeta_3, \ldots$	π	$\epsilon = \frac{4-d}{2}$

`asb` and `xilb` denote the respective bare quantities. The renormalized three-loop coefficient functions are named as follows ($? = g,\, h,\, q$):

`D0?l3`	`V0l3`	`S0l3`	`Cm2?l3`	`CA2?l3`	`Cm3ql3`	`CmA2ql3`	`Cqqql3`	`Cmi2ql3`	`Cmmi2ql3`
$D_0^?$	V_0	S_0	$C^?_{m^2}$	$C^?_{A^2}$	$C^q_{m^3}$	$C^q_{mA^2}$	$C^q_{\bar\psi\psi}$	$C^q_{m_i^2}$	$C^q_{m_1 m_i^2}$

The names of the corresponding bare coefficient functions start with an additional capital `B`.

For the three- and four-loop anomalous dimensions and renormalization constants we use

`betal4`	`gamma2l4`	`gamma3l4`	`gamma3hl4`	`gammaml4`
β	γ_2	γ_3	γ_3^h	γ_m

gammaA2l3,gammaA2l4	gammaA2m2l3	gammaqqm3l3	gammammi2l3
γ_{A^2}	γ_{A^2,m^2}	$\gamma_{\bar{\psi}\psi,m^3}$	$\gamma_{\bar{\psi}\psi,m_1 m_i^2}$

Zal4	Z2l4	Z3l4	Z3hl4	Zml4
Z_α	Z_2	Z_3	Z_3^h	Z_m

ZA2l3,ZA2l4	ZA2m2l3	Zqqm3l3	Zmmil3
Z_{A^2}	Z_{A^2,m^2}	$Z_{\bar{\psi}\psi,m^3}$	$Z_{\bar{\psi}\psi,m_1 m_i^2}$

β is the QCD β-function, γ_m is the quark mass anomalous dimension and γ_2, γ_3 and γ_3^h are the quark, gluon and ghost field anomalous dimensions, respectively. These anomalous dimensions were taken from Ref. [1].

References

[1] K. G. Chetyrkin, Nucl. Phys. B **710** (2005) 499 [arXiv:hep-ph/0405193].