One Loop Matching for Quasi PDF

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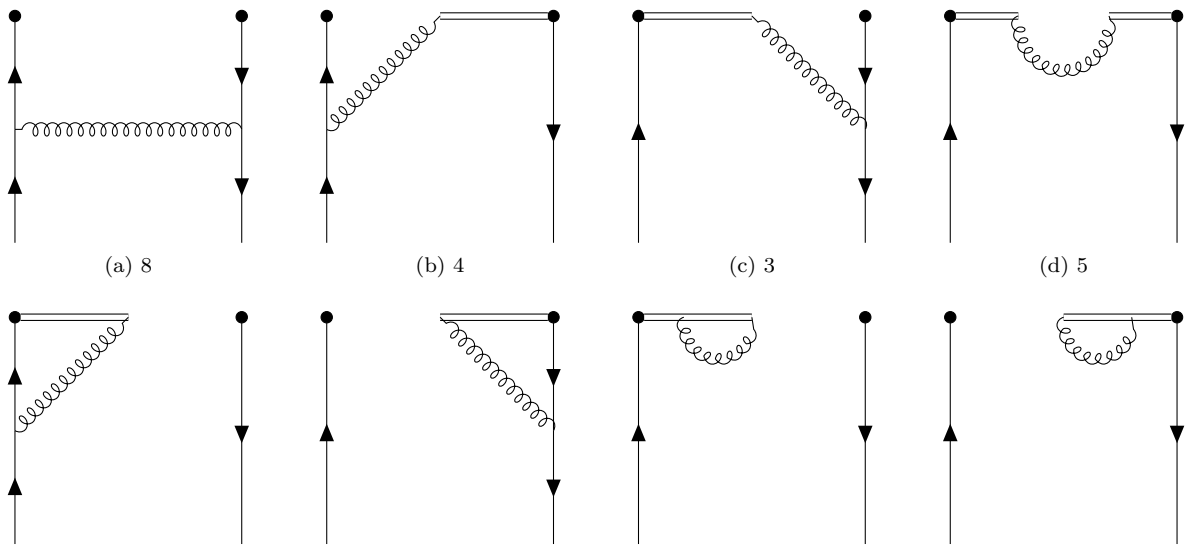
1 Diagrams



(a) 8 (b) 4 (c) 3 (d) 5

(e) 1 (f) 7 (g) 2 (h) 6

Figure 1: Diagrams of quasi PDF in Feynman gauge.

2 Analytic Results

$$\Gamma_a = \tilde{q}_{11} = \frac{\alpha_S C_F}{2\pi} \begin{cases} (x-1)\ln\frac{x-1}{x} + 1, & x > 1 \\ (1-x)\ln\frac{(P^z)^2}{m^2} + (1-x)\ln\frac{4x}{1-x} + 1 - \frac{2x}{1-x}, & 0 < x < 1 \\ (x-1)\ln\frac{x}{x-1} - 1, & x < 0 \end{cases} \tag{1}$$

$$\Gamma_b = \tilde{q}_{12} = \frac{\alpha_S C_F}{2\pi} \begin{cases} -\frac{2x}{1-x}\ln\frac{x-1}{x} - \frac{1}{1-x}, & x > 1 \\ \frac{2x}{1-x}\ln\frac{(p^z)^2}{m^2} + \frac{2x}{1-x}\ln\frac{4x}{1-x} + 1 - \frac{x}{1-x}, & 0 < x < 1 \\ -\frac{2x}{1-x}\ln\frac{x}{x-1} + \frac{1}{1-x}, & x < 0 \end{cases} \tag{2}$$

$$\Gamma_d = \tilde{q}_{13} = \frac{\alpha_S C_F}{2\pi} \begin{cases} \frac{1}{1-x}, & x > 1 \\ -\frac{1}{1-x}, & 0 < x < 1 \\ -\frac{1}{1-x}, & x < 0 \end{cases} \tag{3}$$

3 Numerical Results ($z = 1/4$)

Diagram a/8

```
0.349565 CV(1,3) CV(2,4/3)-0.477465 CV(1,3) CV(2,4/3) log(s)
```

Diagram b/4

```
0.212207 CV(1,3) CV(2,4/3) log(s)-0.273255 CV(1,3) CV(2,4/3)
```

Diagram c/3

```
0.212207 CV(1,3) CV(2,4/3) log(s)-0.273255 CV(1,3) CV(2,4/3)
```

Diagram d/5

```
(-0.8488263632 +- 0)*CV(1,3)*CV(2,4/3)
```

Diagram e/1

```
-(pow(ep,
 ↪  -1)*VE(0.000816940910763346368157062405663127386274704252678589277719 1`57.91219064520137,
 ↪  1.573559789424925624931668641423792657070683730085710006430199999999999999999996`58.1968832491393
 ↪  -
 ↪  I*Log(s)*VE(0.001710997042447389198192130544519783670764184528834537099249`57.23324925883983,
 ↪  4.271482028579777382697383004256461656538920523665798674249`57.63057858349424*^-39) +
 ↪  Log(s)*VE(0.002011388680846484345316982811902863446164410420356823450440 5`58.303496001793235,
 ↪  1.723694006318355410442405777335507593643238012562587407580 5`58.23646017148736*^-39) +
 ↪  I*VE(0.002041472822019871261757020507759581691885328968064951861992`57.309943602566456,
 ↪  7.624077582438239236607155909874508033302478347785472896 29`56.88218730702342*^-7) -
 ↪  VE(0.008867290012058965928678591934196724392569718269407575616033`57.947790912657496,
 ↪  7.243789259153541902289364987292676931611449905233727976407`57.85996580705919*^-7)
```

Diagram f/7

```
-(pow(ep,
 ↪  -1)*VE(0.000816940910763346368157062405663127281012571570463568865045`56.91219064520138,
 ↪  9.160798889579999167228752424173255626841843784041611172283`57.961933349018004*^-45)) +
 ↪  I*Log(s)*VE(0.001710997042447389198192130544519782383782736282344836698587 4`58.23324925883983,
 ↪  1.047543635206050003008225398499371085939572744628823624377 2`58.02017212245887*^-44) +
 ↪  Log(s)*VE(0.002011388680846484345316982811902863312720826014940391240 93`56.30349600179324,
 ↪  6.477663009490828372139324135250424049035023383857992870721`57.81141835075576*^-45) -
 ↪  I*VE(0.002041471297377988262557185812767416099492360713284585807092 6`58.30994327822033,
 ↪  6.135943024985027649893213265102755089734278511599157336027`57.787881318338336*^-10) -
 ↪  VE(0.008867290504621969964938003672921487677952902455900176633184`57.94779093678183,
 ↪  4.827558961834919933380633899515378473034608323487032779 03`56.68372758677938*^-10)
```