

Box integrals currently in the repository

The integrals are organized by the number of massless internal lines. This leads to 16 basic integrals, all of which are now known. Under each integral rubric, there are special cases which are obtainable from the basic integral

Integrals with massless internal lines

1. $I_4^{\{D=4-2\epsilon\}}(0, 0, 0, 0; s_{12}, s_{23}; 0, 0, 0, 0)$
2. $I_4^{\{D=4-2\epsilon\}}(0, 0, 0, p_4^2; s_{12}, s_{23}; 0, 0, 0, 0)$
3. $I_4^{\{D=4-2\epsilon\}}(0, p_2^2, 0, p_4^2; s_{12}, s_{23}; 0, 0, 0, 0)$, "two opposite offshellness (easy)"
4. $I_4^{\{D=4-2\epsilon\}}(0, 0, p_3^2, p_4^2; s_{12}, s_{23}; 0, 0, 0, 0)$, "two adjacent offshellness (hard)"
5. $I_4^{\{D=4-2\epsilon\}}(0, p_2^2, p_3^2, p_4^2; s_{12}, s_{23}; 0, 0, 0, 0)$

Integrals with one non-zero internal mass

6. $I_4^{\{D=4-2\epsilon\}}(0, 0, m^2, m^2; s_{12}, s_{23}; 0, 0, 0, m^2)$
7. $I_4^{\{D=4-2\epsilon\}}(0, 0, m^2, p_4^2; s_{12}, s_{23}; 0, 0, 0, m^2)$
8. $I_4^{\{D=4-2\epsilon\}}(0, 0, p_3^2, p_4^2; s_{12}, s_{23}; 0, 0, 0, m^2)$
 - (a) $I_4^{\{D=4-2\epsilon\}}(0, 0, m_1^2, m_1^2; s_{12}, s_{23}; 0, 0, 0, m^2)$
9. $I_4^{\{D=4-2\epsilon\}}(0, p_2^2, p_3^2, m^2; s_{12}, s_{23}; 0, 0, 0, m^2)$
10. $I_4^{\{D=4-2\epsilon\}}(0, p_2^2, p_3^2, p_4^2; s_{12}, s_{23}; 0, 0, 0, m^2)$

Integrals with two adjacent internal masses

11. $I_4^{\{D=4-2\epsilon\}}(0, m_3^2, p_3^2, m_4^2; s_{12}, s_{23}; 0, 0, m_3^2, m_4^2)$
 - (a) $I_4^{\{D=4-2\epsilon\}}(0, m^2, 0, m^2; s_{12}, s_{23}; 0, 0, m^2, m^2)$
 - (b) $I_4^{\{D=4-2\epsilon\}}(0, m^2, p_3^2, m^2; s_{12}, s_{23}, 0, 0, m^2, m^2)$
 - (c) $I_4^{\{D=4-2\epsilon\}}(0, m_3^2, 0, m_4^2; s_{12}, s_{23}; 0, 0, m_3^2, m_4^2)$
12. $I_4^{\{D=4-2\epsilon\}}(0, m_3^2, p_3^2, p_4^2; s_{12}, s_{23}; 0, 0, m_3^2, m_4^2)$
 - (a) $I_4^{\{D=4-2\epsilon\}}(0, m^2, 0, p_4^2; s_{12}, s_{23}; 0, 0, m^2, m^2)$
 - (b) $I_4^{\{D=4-2\epsilon\}}(0, m_3^2, 0, m_3^2; s_{12}, s_{23}; 0, 0, m_3^2, m_4^2)$
 - (c) $I_4^{\{D=4-2\epsilon\}}(0, m_1^2, 0, p_4^2; s_{12}, s_{23}; 0, 0, m_1^2, m_2^2)$
 - (d) $I_4^{\{D=4-2\epsilon\}}(0, m^2, p_3^2, p_4^2; s_{12}, s_{23}, 0, 0, m^2, m^2)$
 - (e) $I_4^{\{D=4-2\epsilon\}}(0, m_3^2, 0, p_4^2; s_{12}, s_{23}; 0, 0, m_3^2, m_3^2)$
13. $I_4^{\{D=4-2\epsilon\}}(0, p_2^2, p_3^2, p_4^2; s_{12}, s_{23}; 0, 0, m_3^2, m_4^2)$
 - (a) $I_4^{\{D=4-2\epsilon\}}(0, p^2, 0, p^2; s_{12}, s_{23}; 0, 0, m^2, m^2)$
 - (b) $I_4^{\{D=4-2\epsilon\}}(0, m_4^2, 0, m_3^2; s_{12}, s_{23}; 0, 0, m_3^2, m_4^2)$

Integrals with two opposite internal masses

14. $I_4^{\{D=4-2\epsilon\}}(m_2^2, m_2^2, m_4^2, m_4^2; s_{12}, s_{23}; 0, m_2^2, 0, m_4^2)$
15. $I_4^{\{D=4-2\epsilon\}}(p_1^2, m_2^2, m_4^2, p_4^2; s_{12}, s_{23}; 0, m_2^2, 0, m_4^2)$

Integrals with three internal masses

16. $I_4^{\{D=4-2\epsilon\}}(m_2^2, p_2^2, p_3^2, m_4^2; s_{12}, s_{23}; 0, m_2^2, m_3^2, m_4^2)$

- (a) $I_4^{\{D=4-2\epsilon\}}(m^2, 0, 0, m^2; s_{12}, s_{23}; 0, m^2, m^2, m^2)$
- (b) $I_4^{\{D=4-2\epsilon\}}(m^2, 0, p_3^2, m^2; s_{12}, s_{23}; 0, m^2, m^2, m^2)$
- (c) $I_4^{\{D=4-2\epsilon\}}(m^2, p_2^2, p_3^2, m^2; s_{12}, s_{23}; 0, m^2, m^2, m^2)$
- (d) $I_4^{\{D=4-2\epsilon\}}(m_1^2, 0, 0, m_1^2; s_{12}, s_{23}; 0, m_1^2, m_2^2, m_1^2)$
- (e) $I_4^{\{D=4-2\epsilon\}}(m_2^2, 0, 0, m_1^2; s_{12}, s_{23}; 0, m_2^2, m_1^2, m_1^2)$