

Lampiran 1. Hasil Pembuktian Teorema 3.1.1.1

Hasil pembuktian Teorema 3.1.1.1 bertujuan untuk mengetahui orde dari metode Orde-6 dengan $Out[3]$ merupakan hasil langkah pertama, $Out[5]$ adalah hasil langkah kedua, dan $Out[8]$ adalah hasil pada langkah ketiga.

$$Out[3] = \frac{e}{3} + \frac{2c_2 e^2}{3} - \frac{2}{3}(2c_2^2 - 2c_3)e^3 - \frac{2}{3}(-4c_2^3 + 7c_2 c_3 - 3c_4)e^4 \\ - \frac{2}{3}(8c_2^4 - 20c_2^2 c_3 + 6c_3^2 + 10c_2 c_4 - 4c_5)e^5 + O[e]^6$$



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Out[5]

$$\begin{aligned}
 &= (c_2 c_3 - \text{dfac}_2(-\frac{88 c_2^2}{9 \text{dfa}} + \frac{\frac{64 c_2^2}{9} - \frac{13 c_3}{3}}{\text{dfa}} \\
 &\quad + \frac{\frac{100}{3} \text{dfa}^2 c_2^2 + 9(\frac{4}{9} \text{dfa}^2 c_2^2 + 2 \text{dfa}^2(\frac{4 c_2^2}{3} + \frac{c_3}{3})) - 2 \text{dfa}^2(\frac{4 c_2^2}{3} + \frac{c_3}{3}) + 48 \text{dfa}^2 c_3}{16 \text{dfa}^3}) \\
 &\quad - c_4 - \text{dfa}(\frac{8 c_2(\frac{64 c_2^2}{9} - \frac{13 c_3}{3})}{3 \text{dfa}} \\
 &\quad - \frac{11 c_2(\frac{100}{3} \text{dfa}^2 c_2^2 + 9(\frac{4}{9} \text{dfa}^2 c_2^2 + 2 \text{dfa}^2(\frac{4 c_2^2}{3} + \frac{c_3}{3})) - 2 \text{dfa}^2(\frac{4 c_2^2}{3} + \frac{c_3}{3}) + 48 \text{dfa}^2 c_3}{48 \text{dfa}^3}) \\
 &\quad + \frac{-\frac{167 c_2^3}{27} + \frac{145 c_2 c_3}{9} - \frac{142 c_4}{27}}{\text{dfa}} + \frac{1}{16 \text{dfa}^3} (-4 \text{dfa}^2 c_2(\frac{4 c_2^2}{3} + \frac{c_3}{3}) \\
 &\quad + 104 \text{dfa}^2 c_2 c_3 + 9(\frac{4}{3} \text{dfa}^2 c_2(\frac{4 c_2^2}{3} + \frac{c_3}{3}) + 2 \text{dfa}^2(-\frac{4}{3} c_2(2 c_2^2 - 2 c_3) \\
 &\quad + \frac{4 c_2 c_3}{3} + \frac{4 c_4}{27})) - 2 \text{dfa}^2(-\frac{4}{3} c_2(2 c_2^2 - 2 c_3) + \frac{4 c_2 c_3}{3} + \frac{4 c_4}{27}) \\
 &\quad + 64 \text{dfa}^2 c_4))) e^4 + (-\text{dfac}_3(-\frac{88 c_2^2}{9 \text{dfa}} + \frac{\frac{64 c_2^2}{9} - \frac{13 c_3}{3}}{\text{dfa}} \\
 &\quad + \frac{\frac{100}{3} \text{dfa}^2 c_2^2 + 9(\frac{4}{9} \text{dfa}^2 c_2^2 + 2 \text{dfa}^2(\frac{4 c_2^2}{3} + \frac{c_3}{3})) - 2 \text{dfa}^2(\frac{4 c_2^2}{3} + \frac{c_3}{3}) + 48 \text{dfa}^2 c_3}{16 \text{dfa}^3}) \\
 &\quad + c_2 c_4 - \text{dfac}_2(\frac{8 c_2(\frac{64 c_2^2}{9} - \frac{13 c_3}{3})}{3 \text{dfa}} \\
 &\quad - \frac{11 c_2(\frac{100}{3} \text{dfa}^2 c_2^2 + 9(\frac{4}{9} \text{dfa}^2 c_2^2 + 2 \text{dfa}^2(\frac{4 c_2^2}{3} + \frac{c_3}{3})) - 2 \text{dfa}^2(\frac{4 c_2^2}{3} + \frac{c_3}{3}) + 48 \text{dfa}^2 c_3}{48 \text{dfa}^3}) \\
 &\quad + \frac{-\frac{167 c_2^3}{27} + \frac{145 c_2 c_3}{9} - \frac{142 c_4}{27}}{\text{dfa}} + \frac{1}{16 \text{dfa}^3} (-4 \text{dfa}^2 c_2(\frac{4 c_2^2}{3} + \frac{c_3}{3}) \\
 &\quad + 104 \text{dfa}^2 c_2 c_3 + 9(\frac{4}{3} \text{dfa}^2 c_2(\frac{4 c_2^2}{3} + \frac{c_3}{3}) + 2 \text{dfa}^2(-\frac{4}{3} c_2(2 c_2^2 - 2 c_3)
 \end{aligned}$$

$$\begin{aligned}
& + \frac{4c_2c_3}{3} + \frac{4c_4}{27}) - 2dfa^2(-\frac{4}{3}c_2(2c_2^2 - 2c_3) + \frac{4c_2c_3}{3} + \frac{4c_4}{27}) \\
& + 64dfa^2c_4)) - c_5 - dfa(\frac{1}{16dfa^3}(\frac{64c_2^2}{9} - \frac{13c_3}{3})(\frac{100}{3}dfa^2c_2^2 \\
& + 9(\frac{4}{9}dfa^2c_2^2 + 2dfa^2(\frac{4c_2^2}{3} + \frac{c_3}{3})) - 2dfa^2(\frac{4c_2^2}{3} + \frac{c_3}{3}) + 48dfa^2c_3) \\
& + \frac{8c_2(-\frac{167c_2^3}{27} + \frac{145c_2c_3}{9} - \frac{142c_4}{27})}{3dfa} - \frac{1}{48dfa^3}11c_2(-4dfa^2c_2(\frac{4c_2^2}{3} + \frac{c_3}{3}) \\
& + 104dfa^2c_2c_3 + 9(\frac{4}{3}dfa^2c_2(\frac{4c_2^2}{3} + \frac{c_3}{3}) + 2dfa^2(-\frac{4}{3}c_2(2c_2^2 - 2c_3) \\
& + \frac{4c_2c_3}{3} + \frac{4c_4}{27})) - 2dfa^2(-\frac{4}{3}c_2(2c_2^2 - 2c_3) + \frac{4c_2c_3}{3} + \frac{4c_4}{27}) + 64dfa^2c_4) \\
& + \frac{-\frac{929c_2^4}{81} - 19c_2^2c_3 + \frac{88c_3^2}{9} + \frac{1615c_2c_4}{81} - \frac{515c_5}{81}}{dfa} + \frac{1}{16dfa^3}(-6dfa^2(\frac{4c_2^2}{3} \\
& + \frac{c_3}{3})c_3 + 81dfa^2c_3^2 - 4dfa^2c_2(-\frac{4}{3}c_2(2c_2^2 - 2c_3) + \frac{4c_2c_3}{3} + \frac{4c_4}{27}) \\
& + \frac{416}{3}dfa^2c_2c_4 + 9(dfa^2(\frac{4c_2^2}{3} + \frac{c_3}{3})^2 + \frac{4}{3}dfa^2c_2(-\frac{4}{3}c_2(2c_2^2 - 2c_3) \\
& + \frac{4c_2c_3}{3} + \frac{4c_4}{27}) + 2dfa^2(3(\frac{4c_2^2}{9} - \frac{4}{9}(2c_2^2 - 2c_3))c_3 - \frac{4}{3}c_2(-4c_2^3 + 7c_2c_3 \\
& - 3c_4) + \frac{8c_2c_4}{9} + \frac{5c_5}{81})) - 2dfa^2(3(\frac{4c_2^2}{9} - \frac{4}{9}(2c_2^2 - 2c_3))c_3 - \frac{4}{3}c_2(-4c_2^3 \\
& + 7c_2c_3 - 3c_4) + \frac{8c_2c_4}{9} + \frac{5c_5}{81}) + 80dfa^2c_5)))e^5 + (-dfa(-\frac{88c_2^2}{9dfa} \\
& + \frac{\frac{64c_2^2}{9} - \frac{13c_3}{3}}{dfa} \\
& + \frac{\frac{100}{3}dfa^2c_2^2 + 9(\frac{4}{9}dfa^2c_2^2 + 2dfa^2(\frac{4c_2^2}{3} + \frac{c_3}{3})) - 2dfa^2(\frac{4c_2^2}{3} + \frac{c_3}{3}}{16dfa^3} \\
&) + 48dfa^2c_3) \\
& - dfac_3(-\frac{8c_2(\frac{64c_2^2}{9} - \frac{13c_3}{3})}{3dfa})
\end{aligned}$$

$$\begin{aligned}
& \frac{11c_2(\frac{100}{3}dfa^2c_2^2 + 9(\frac{4}{9}dfa^2c_2^2 + 2dfa^2(\frac{4c_2^2}{3} + \frac{c_3}{3})) - 2dfa^2(\frac{4c_2^2}{3} + \frac{c_3}{3}) \\
& \quad + 48dfa^2c_3)}{48dfa^3} \\
& + \frac{-\frac{167c_2^3}{27} + \frac{145c_2c_3}{9} - \frac{142c_4}{27}}{dfa} + \frac{1}{16dfa^3}(-4dfa^2c_2(\frac{4c_2^2}{3} + \frac{c_3}{3}) \\
& + 104dfa^2c_2c_3 + 9(\frac{4}{3}dfa^2c_2(\frac{4c_2^2}{3} + \frac{c_3}{3}) + 2dfa^2(-\frac{4}{3}c_2(2c_2^2 - 2c_3) \\
& + \frac{4c_2c_3}{3} + \frac{4c_4}{27})) - 2dfa^2(-\frac{4}{3}c_2(2c_2^2 - 2c_3) + \frac{4c_2c_3}{3} + \frac{4c_4}{27}) \\
& + 64dfa^2c_4)) + c_2c_5 - dfac_2(\frac{1}{16dfa^3}(\frac{64c_2^2}{9} - \frac{13c_3}{3})(\frac{100}{3}dfa^2c_2^2 \\
& + 9(\frac{4}{9}dfa^2c_2^2 + 2dfa^2(\frac{4c_2^2}{3} + \frac{c_3}{3})) - 2dfa^2(\frac{4c_2^2}{3} + \frac{c_3}{3}) + 48dfa^2c_3) \\
& + \frac{8c_2(-\frac{167c_2^3}{27} + \frac{145c_2c_3}{9} - \frac{142c_4}{27})}{3dfa} - \frac{1}{48dfa^3}11c_2(-4dfa^2c_2(\frac{4c_2^2}{3} + \frac{c_3}{3}) \\
& + 104dfa^2c_2c_3 + 9(\frac{4}{3}dfa^2c_2(\frac{4c_2^2}{3} + \frac{c_3}{3}) + 2dfa^2(-\frac{4}{3}c_2(2c_2^2 - 2c_3) \\
& + \frac{4c_2c_3}{3} + \frac{4c_4}{27})) - 2dfa^2(-\frac{4}{3}c_2(2c_2^2 - 2c_3) + \frac{4c_2c_3}{3} + \frac{4c_4}{27}) + 64dfa^2c_4) \\
& + \frac{-\frac{929c_2^4}{81} - 19c_2^2c_3 + \frac{88c_3^2}{9} + \frac{1615c_2c_4}{81} - \frac{515c_5}{81}}{dfa} + \frac{1}{16dfa^3}(-6dfa^2(\frac{4c_2^2}{3} \\
& + \frac{c_3}{3})c_3 + 81dfa^2c_3^2 - 4dfa^2c_2(-\frac{4}{3}c_2(2c_2^2 - 2c_3) + \frac{4c_2c_3}{3} + \frac{4c_4}{27}) \\
& + \frac{416}{3}dfa^2c_2c_4 + 9(dfa^2(\frac{4c_2^2}{3} + \frac{c_3}{3})^2 + \frac{4}{3}dfa^2c_2(-\frac{4}{3}c_2(2c_2^2 - 2c_3) \\
& + \frac{4c_2c_3}{3} + \frac{4c_4}{27}) + 2dfa^2(3(\frac{4c_2^2}{9} - \frac{4}{9}(2c_2^2 - 2c_3))c_3 - \frac{4}{3}c_2(-4c_2^3 + 7c_2c_3 \\
& - 3c_4) + \frac{8c_2c_4}{9} + \frac{5c_5}{81})) - 2dfa^2(3(\frac{4c_2^2}{9} - \frac{4}{9}(2c_2^2 - 2c_3))c_3 - \frac{4}{3}c_2(-4c_2^3 \\
& + 7c_2c_3 - 3c_4) + \frac{8c_2c_4}{9} + \frac{5c_5}{81}) + 80dfa^2c_5)) - c_6 \\
& - dfa(\frac{1}{16dfa^3}(\frac{100}{3}dfa^2c_2^2 + 9(\frac{4}{9}dfa^2c_2^2 + 2dfa^2(\frac{4c_2^2}{3} + \frac{c_3}{3}))) - 2dfa^2(\frac{4c_2^2}{3}
\end{aligned}$$

$$\begin{aligned}
& + \frac{c_3}{3}) + 48dfa^2c_3)(-\frac{167c_2^3}{27} + \frac{145c_2c_3}{9} - \frac{142c_4}{27}) \\
& + \frac{1}{16dfa^3}(\frac{64c_2^2}{9} - \frac{13c_3}{3})(-4dfa^2c_2(\frac{4c_2^2}{3} + \frac{c_3}{3}) \\
& + 104dfa^2c_2c_3 + 9(\frac{4}{3}dfa^2c_2(\frac{4c_2^2}{3} + \frac{c_3}{3}) \\
& + 2dfa^2(-\frac{4}{3}c_2(2c_2^2 - 2c_3) + \frac{4c_2c_3}{3} + \frac{4c_4}{27})) \\
& - 2dfa^2(-\frac{4}{3}c_2(2c_2^2 - 2c_3) + \frac{4c_2c_3}{3} + \frac{4c_4}{27}) + 64dfa^2c_4) \\
& + \frac{8c_2(-\frac{929c_2^4}{81} - 19c_2^2c_3 + \frac{88c_3^2}{9} + \frac{1615c_2c_4}{81} - \frac{515c_5}{81})}{3dfa} \\
& - \frac{1}{48dfa^3}11c_2(-6dfa^2(\frac{4c_2^2}{3} + \frac{c_3}{3})c_3 + 81dfa^2c_2^2 \\
& - 4dfa^2c_2(-\frac{4}{3}c_2(2c_2^2 - 2c_3) + \frac{4c_2c_3}{3} + \frac{4c_4}{27}) \\
& + \frac{416}{3}dfa^2c_2c_4 + 9(dfa^2(\frac{4c_2^2}{3} + \frac{c_3}{3})^2 \\
& + \frac{4}{3}dfa^2c_2(-\frac{4}{3}c_2(2c_2^2 - 2c_3) + \frac{4c_2c_3}{3} + \frac{4c_4}{27}) \\
& + 2dfa^2(3(\frac{4c_2^2}{9} - \frac{4}{9}(2c_2^2 - 2c_3)))c_3 - \frac{4}{3}c_2(-4c_2^3 + 7c_2c_3 \\
& - 3c_4) + \frac{8c_2c_4}{9} + \frac{5c_5}{81})) - 2dfa^2(3(\frac{4c_2^2}{9} - \frac{4}{9}(2c_2^2 \\
& - 2c_3))c_3 - \frac{4}{3}c_2(-4c_2^3 + 7c_2c_3 - 3c_4) + \frac{8c_2c_4}{9} + \frac{5c_5}{81}) \\
& + 80dfa^2c_5) + \frac{1}{16dfa^3}(-6dfa^2c_3(-\frac{4}{3}c_2(2c_2^2 - 2c_3) \\
& + \frac{4c_2c_3}{3} + \frac{4c_4}{27}) - 8dfa^2(\frac{4c_2^2}{3} + \frac{c_3}{3})c_4 + 216dfa^2c_3c_4 \\
& - 4dfa^2c_2(3(\frac{4c_2^2}{9} - \frac{4}{9}(2c_2^2 - 2c_3)))c_3 - \frac{4}{3}c_2(-4c_2^3 \\
& + 7c_2c_3 - 3c_4) + \frac{8c_2c_4}{9} + \frac{5c_5}{81}) + \frac{520}{3}dfa^2c_2c_5
\end{aligned}$$

$$\begin{aligned}
& + 9(2\text{dfa}^2(\frac{4c_2^2}{3} + \frac{c_3}{3})(-\frac{4}{3}c_2(2c_2^2 - 2c_3) + \frac{4c_2c_3}{3} + \frac{4c_4}{27}) \\
& + \frac{4}{3}\text{dfa}^2c_2(3(\frac{4c_2^2}{9} - \frac{4}{9}(2c_2^2 - 2c_3))c_3 - \frac{4}{3}c_2(-4c_2^3 \\
& + 7c_2c_3 - 3c_4) + \frac{8c_2c_4}{9} + \frac{5c_5}{81}) + 2\text{dfa}^2(3c_3(-\frac{8}{9}c_2(2c_2^2 \\
& - 2c_3) - \frac{4}{9}(-4c_2^3 + 7c_2c_3 - 3c_4)) + \frac{4}{27}(12c_2^2 - 6(2c_2^2 \\
& - 2c_3))c_4 - \frac{4}{3}c_2(8c_2^4 - 20c_2^2c_3 + 6c_3^2 + 10c_2c_4 - 4c_5) \\
& + \frac{40c_2c_5}{81} + \frac{2c_6}{81})) - 2\text{dfa}^2(3c_3(-\frac{8}{9}c_2(2c_2^2 - 2c_3) \\
& - \frac{4}{9}(-4c_2^3 + 7c_2c_3 - 3c_4)) + \frac{4}{27}(12c_2^2 - 6(2c_2^2 \\
& - 2c_3))c_4 - \frac{4}{3}c_2(8c_2^4 - 20c_2^2c_3 + 6c_3^2 + 10c_2c_4 - 4c_5) \\
& + \frac{40c_2c_5}{81} + \frac{2c_6}{81}) + 96\text{dfa}^2c_6) \\
& + \frac{1}{\text{dfa}}(1/(16\text{dfa}^3)(\frac{160}{3}\text{dfa}^3c_2^2 + 48\text{dfa}^3c_3 \\
& + \text{dfa}(\frac{16}{3}\text{dfa}^2c_2^2 + 12(\frac{4}{9}\text{dfa}^2c_2^2 + 2\text{dfa}^2(\frac{4c_2^2}{3} + \frac{c_3}{3})) \\
& + 4\text{dfa}^2(\frac{4c_2^2}{3} + \frac{c_3}{3}) + 12\text{dfa}^2c_3))(\frac{167c_2^3}{27} - \frac{145c_2c_3}{9} \\
& + \frac{142c_4}{27}) + 1/(16\text{dfa}^3)(-\frac{64c_2^2}{9} + \frac{13c_3}{3})(80\text{dfa}^3c_2c_3 \\
& + 2\text{dfac}_2(\frac{16}{3}\text{dfa}^2c_2^2 + 12(\frac{4}{9}\text{dfa}^2c_2^2 + 2\text{dfa}^2(\frac{4c_2^2}{3} + \frac{c_3}{3})) \\
& + 4\text{dfa}^2(\frac{4c_2^2}{3} + \frac{c_3}{3}) + 12\text{dfa}^2c_3) + 64\text{dfa}^3c_4 \\
& + \text{dfa}(8\text{dfa}^2c_2(\frac{4c_2^2}{3} + \frac{c_3}{3}) + 8\text{dfa}^2c_2c_3 \\
& + 12(\frac{4}{3}\text{dfa}^2c_2(\frac{4c_2^2}{3} + \frac{c_3}{3}) + 2\text{dfa}^2(-\frac{4}{3}c_2(2c_2^2 - 2c_3) \\
& + \frac{4c_2c_3}{3} + \frac{4c_4}{27})) + 4\text{dfa}^2(-\frac{4}{3}c_2(2c_2^2 - 2c_3) + \frac{4c_2c_3}{3})
\end{aligned}$$

$$\begin{aligned}
& + \frac{4c_4}{27}) + 16dfa^2c_4)) - \frac{11}{3}c_2(-\frac{929c_2^4}{81} - 19c_2^2c_3 + \frac{88c_3^2}{9} \\
& + \frac{1615c_2c_4}{81} - \frac{515c_5}{81}) \\
& + 1/(48dfa^3) 11c_2(3dfac_3(\frac{16}{3}dfa^2c_2^2 + 12(\frac{4}{9}dfa^2c_2^2 \\
& + 2dfa^2(\frac{4c_2^2}{3} + \frac{c_3}{3})) + 4dfa^2(\frac{4c_2^2}{3} + \frac{c_3}{3}) + 12dfa^2c_3) \\
& + \frac{320}{3}dfa^3c_2c_4 + 2dfac_2(8dfa^2c_2(\frac{4c_2^2}{3} + \frac{c_3}{3}) + 8dfa^2c_2c_3 \\
& + 12(\frac{4}{3}dfa^2c_2(\frac{4c_2^2}{3} + \frac{c_3}{3}) + 2dfa^2(-\frac{4}{3}c_2(2c_2^2 - 2c_3) \\
& + \frac{4c_2c_3}{3} + \frac{4c_4}{27})) + 4dfa^2(-\frac{4}{3}c_2(2c_2^2 - 2c_3) + \frac{4c_2c_3}{3} \\
& + \frac{4c_4}{27}) + 16dfa^2c_4) + 80dfa^3c_5 + dfa(12dfa^2(\frac{4c_2^2}{3} \\
& + \frac{c_3}{3})c_3 + 8dfa^2c_2(-\frac{4}{3}c_2(2c_2^2 - 2c_3) + \frac{4c_2c_3}{3} + \frac{4c_4}{27}) \\
& + \frac{32}{3}dfa^2c_2c_4 + 12(dfa^2(\frac{4c_2^2}{3} + \frac{c_3}{3})^2 \\
& + \frac{4}{3}dfa^2c_2(-\frac{4}{3}c_2(2c_2^2 - 2c_3) + \frac{4c_2c_3}{3} + \frac{4c_4}{27}) \\
& + 2dfa^2(3(-\frac{4c_2^2}{9} - \frac{4}{9}(2c_2^2 - 2c_3))c_3 - \frac{4}{3}c_2(-4c_2^3 + 7c_2c_3 \\
& - 3c_4) + \frac{8c_2c_4}{9} + \frac{5c_5}{81})) + 4dfa^2(3(\frac{4c_2^2}{9} - \frac{4}{9}(2c_2^2 \\
& - 2c_3))c_3 - \frac{4}{3}c_2(-4c_2^3 + 7c_2c_3 - 3c_4) + \frac{8c_2c_4}{9} + \frac{5c_5}{81}) \\
& + 20dfa^2c_5)) - 1/(16dfa^3)(4dfa(\frac{16}{3}dfa^2c_2^2 \\
& + 12(\frac{4}{9}dfa^2c_2^2 + 2dfa^2(\frac{4c_2^2}{3} + \frac{c_3}{3})) + 4dfa^2(\frac{4c_2^2}{3} + \frac{c_3}{3}) \\
& + 12dfa^2c_3)c_4 + 3dfac_3(8dfa^2c_2(\frac{4c_2^2}{3} + \frac{c_3}{3}) + 8dfa^2c_2c_3
\end{aligned}$$

$$\begin{aligned}
& + 12\left(\frac{4}{3}\text{dfa}^2c_2\left(\frac{4c_2^2}{3} + \frac{c_3}{3}\right) + 2\text{dfa}^2\left(-\frac{4}{3}c_2(2c_2^2 - 2c_3)\right.\right. \\
& \left. + \frac{4c_2c_3}{3} + \frac{4c_4}{27}\right)) + 4\text{dfa}^2\left(-\frac{4}{3}c_2(2c_2^2 - 2c_3) + \frac{4c_2c_3}{3}\right. \\
& \left. + \frac{4c_4}{27}\right) + 16\text{dfa}^2c_4) + \frac{400}{3}\text{dfa}^3c_2c_5 \\
& + 2\text{dfac}_2(12\text{dfa}^2\left(\frac{4c_2^2}{3} + \frac{c_3}{3}\right)c_3 + 8\text{dfa}^2c_2\left(-\frac{4}{3}c_2(2c_2^2\right. \\
& \left. - 2c_3) + \frac{4c_2c_3}{3} + \frac{4c_4}{27}\right) + \frac{32}{3}\text{dfa}^2c_2c_4 \\
& + 12(\text{dfa}^2\left(\frac{4c_2^2}{3} + \frac{c_3}{3}\right)^2 + \frac{4}{3}\text{dfa}^2c_2\left(-\frac{4}{3}c_2(2c_2^2 - 2c_3)\right. \\
& \left. + \frac{4c_2c_3}{3} + \frac{4c_4}{27}\right) + 2\text{dfa}^2\left(3\left(\frac{4c_2^2}{9} - \frac{4}{9}(2c_2^2 - 2c_3)\right)c_3\right. \\
& \left. - \frac{4}{3}c_2(-4c_2^3 + 7c_2c_3 - 3c_4) + \frac{8c_2c_4}{9} + \frac{5c_5}{81}\right)) \\
& + 4\text{dfa}^2\left(3\left(\frac{4c_2^2}{9} - \frac{4}{9}(2c_2^2 - 2c_3)\right)c_3 - \frac{4}{3}c_2(-4c_2^3 + 7c_2c_3\right. \\
& \left. - 3c_4) + \frac{8c_2c_4}{9} + \frac{5c_5}{81}\right) + 20\text{dfa}^2c_5) + 96\text{dfa}^3c_6 \\
& + \text{dfa}(12\text{dfa}^2c_3\left(-\frac{4}{3}c_2(2c_2^2 - 2c_3) + \frac{4c_2c_3}{3} + \frac{4c_4}{27}\right) \\
& + 16\text{dfa}^2\left(\frac{4c_2^2}{3} + \frac{c_3}{3}\right)c_4 + 8\text{dfa}^2c_2\left(3\left(\frac{4c_2^2}{9} - \frac{4}{9}(2c_2^2\right. \right. \\
& \left. - 2c_3)\right)c_3 - \frac{4}{3}c_2(-4c_2^3 + 7c_2c_3 - 3c_4) + \frac{8c_2c_4}{9} + \frac{5c_5}{81}) \\
& + \frac{40}{3}\text{dfa}^2c_2c_5 + 12(2\text{dfa}^2\left(\frac{4c_2^2}{3} + \frac{c_3}{3}\right)\left(-\frac{4}{3}c_2(2c_2^2 - 2c_3)\right. \\
& \left. + \frac{4c_2c_3}{3} + \frac{4c_4}{27}\right) + \frac{4}{3}\text{dfa}^2c_2\left(3\left(\frac{4c_2^2}{9} - \frac{4}{9}(2c_2^2 - 2c_3)\right)c_3\right. \\
& \left. - \frac{4}{3}c_2(-4c_2^3 + 7c_2c_3 - 3c_4) + \frac{8c_2c_4}{9} + \frac{5c_5}{81}\right) \\
& + 2\text{dfa}^2\left(3c_3\left(-\frac{8}{9}c_2(2c_2^2 - 2c_3) - \frac{4}{9}(-4c_2^3 + 7c_2c_3\right. \right. \\
& \left. - 3c_4)\right) + \frac{4}{27}(12c_2^2 - 6(2c_2^2 - 2c_3))c_4 - \frac{4}{3}c_2(8c_2^4
\end{aligned}$$

$$\begin{aligned} & - 20c_2^2c_3 + 6c_3^2 + 10c_2c_4 - 4c_5) + \frac{40c_2c_5}{81} + \frac{2c_6}{81}) \\ & + 4dfa^2(3c_3(-\frac{8}{9}c_2(2c_2^2 - 2c_3) - \frac{4}{9}(-4c_2^3 + 7c_2c_3 \\ & - 3c_4)) + \frac{4}{27}(12c_2^2 - 6(2c_2^2 - 2c_3))c_4 - \frac{4}{3}c_2(8c_2^4 \\ & - 20c_2^2c_3 + 6c_3^2 + 10c_2c_4 - 4c_5) + \frac{40c_2c_5}{81} + \frac{2c_6}{81}) \\ & + 24dfa^2c_6))))e^6 + O[e]^7 \end{aligned}$$



Out[8]

$$\begin{aligned}
&= -\frac{4}{3}(c_2(c_2c_3 - \text{dfac}_2(-\frac{88c_2^2}{9\text{dfa}} + \frac{\frac{64c_2^2}{9} - \frac{13c_3}{3}}{\text{dfa}} \\
&\quad + \frac{\frac{100}{3}\text{dfa}^2c_2^2 + 9(\frac{4}{9}\text{dfa}^2c_2^2 + 2\text{dfa}^2(\frac{4c_2^2}{3} + \frac{c_3}{3})) - 2\text{dfa}^2(\frac{4c_2^2}{3} + \frac{c_3}{3}) + 48\text{dfa}^2c_3}{16\text{dfa}^3}) \\
&\quad - c_4 - \text{dfa}(\frac{8c_2(\frac{64c_2^2}{9} - \frac{13c_3}{3})}{3\text{dfa}} - \frac{1}{48\text{dfa}^3}11c_2(\frac{100}{3}\text{dfa}^2c_2^2 + 9(\frac{4}{9}\text{dfa}^2c_2^2 \\
&\quad + 2\text{dfa}^2(\frac{4c_2^2}{3} + \frac{c_3}{3})) - 2\text{dfa}^2(\frac{4c_2^2}{3} + \frac{c_3}{3}) + 48\text{dfa}^2c_3) \\
&\quad + \frac{-\frac{167c_2^3}{27} + \frac{145c_2c_3}{9} - \frac{142c_4}{27}}{\text{dfa}} + \frac{1}{16\text{dfa}^3}(-4\text{dfa}^2c_2(\frac{4c_2^2}{3} + \frac{c_3}{3}) \\
&\quad + 104\text{dfa}^2c_2c_3 + 9(\frac{4}{3}\text{dfa}^2c_2(\frac{4c_2^2}{3} + \frac{c_3}{3}) + 2\text{dfa}^2(-\frac{4}{3}c_2(2c_2^2 - 2c_3) \\
&\quad + \frac{4c_2c_3}{3} + \frac{4c_4}{27})) - 2\text{dfa}^2(-\frac{4}{3}c_2(2c_2^2 - 2c_3) + \frac{4c_2c_3}{3} + \frac{4c_4}{27}) \\
&\quad + 64\text{dfa}^2c_4))))e^5 + (-(\frac{4c_2^2}{9} + \frac{11c_3}{3})(c_2c_3 - \text{dfac}_2(-\frac{88c_2^2}{9\text{dfa}} + \frac{\frac{64c_2^2}{9} - \frac{13c_3}{3}}{\text{dfa}} \\
&\quad + \frac{\frac{100}{3}\text{dfa}^2c_2^2 + 9(\frac{4}{9}\text{dfa}^2c_2^2 + 2\text{dfa}^2(\frac{4c_2^2}{3} + \frac{c_3}{3})) - 2\text{dfa}^2(\frac{4c_2^2}{3} + \frac{c_3}{3}) + 48\text{dfa}^2c_3}{16\text{dfa}^3}) \\
&\quad - c_4 - \text{dfa}(\frac{8c_2(\frac{64c_2^2}{9} - \frac{13c_3}{3})}{3\text{dfa}} - \frac{1}{48\text{dfa}^3}11c_2(\frac{100}{3}\text{dfa}^2c_2^2 + 9(\frac{4}{9}\text{dfa}^2c_2^2 \\
&\quad + 2\text{dfa}^2(\frac{4c_2^2}{3} + \frac{c_3}{3})) - 2\text{dfa}^2(\frac{4c_2^2}{3} + \frac{c_3}{3}) + 48\text{dfa}^2c_3) \\
&\quad + \frac{-\frac{167c_2^3}{27} + \frac{145c_2c_3}{9} - \frac{142c_4}{27}}{\text{dfa}} + \frac{1}{16\text{dfa}^3}(-4\text{dfa}^2c_2(\frac{4c_2^2}{3} + \frac{c_3}{3}) \\
&\quad + 104\text{dfa}^2c_2c_3 + 9(\frac{4}{3}\text{dfa}^2c_2(\frac{4c_2^2}{3} + \frac{c_3}{3}) + 2\text{dfa}^2(-\frac{4}{3}c_2(2c_2^2 - 2c_3) \\
&\quad + \frac{4c_2c_3}{3} + \frac{4c_4}{27})) - 2\text{dfa}^2(-\frac{4}{3}c_2(2c_2^2 - 2c_3) + \frac{4c_2c_3}{3} + \frac{4c_4}{27}) \\
&\quad + 64\text{dfa}^2c_4)))) - \frac{4}{3}c_2(-\text{dfac}_3(-\frac{88c_2^2}{9\text{dfa}} + \frac{\frac{64c_2^2}{9} - \frac{13c_3}{3}}{\text{dfa}}
\end{aligned}$$

$$\begin{aligned}
& + \frac{\frac{100}{3}dfa^2c_2^2 + 9(\frac{4}{9}dfa^2c_2^2 + 2dfa^2(\frac{4c_2^2}{3} + \frac{c_3}{3})) - 2dfa^2(\frac{4c_2^2}{3} + \frac{c_3}{3}) + 48dfa^2c_3}{16dfa^3} \\
& + c_2c_4 - dfac_2(\frac{8c_2(\frac{64c_2^2}{9} - \frac{13c_3}{3})}{3dfa} - \frac{1}{48dfa^3}11c_2(\frac{100}{3}dfa^2c_2^2 + 9(\frac{4}{9}dfa^2c_2^2 \\
& + 2dfa^2(\frac{4c_2^2}{3} + \frac{c_3}{3})) - 2dfa^2(\frac{4c_2^2}{3} + \frac{c_3}{3}) + 48dfa^2c_3) \\
& + \frac{-\frac{167c_2^3}{27} + \frac{145c_2c_3}{9} - \frac{142c_4}{27}}{dfa} + \frac{1}{16dfa^3}(-4dfa^2c_2(\frac{4c_2^2}{3} + \frac{c_3}{3}) \\
& + 104dfa^2c_2c_3 + 9(\frac{4}{3}dfa^2c_2(\frac{4c_2^2}{3} + \frac{c_3}{3}) + 2dfa^2(-\frac{4}{3}c_2(2c_2^2 - 2c_3) \\
& + \frac{4c_2c_3}{3} + \frac{4c_4}{27})) - 2dfa^2(-\frac{4}{3}c_2(2c_2^2 - 2c_3) + \frac{4c_2c_3}{3} + \frac{4c_4}{27}) \\
& + 64dfa^2c_4)) - c_5 - dfa(\frac{1}{16dfa^3}(\frac{64c_2^2}{9} - \frac{13c_3}{3})(\frac{100}{3}dfa^2c_2^2 \\
& + 9(\frac{4}{9}dfa^2c_2^2 + 2dfa^2(\frac{4c_2^2}{3} + \frac{c_3}{3})) - 2dfa^2(\frac{4c_2^2}{3} + \frac{c_3}{3}) + 48dfa^2c_3) \\
& + \frac{8c_2(-\frac{167c_2^3}{27} + \frac{145c_2c_3}{9} - \frac{142c_4}{27})}{3dfa} - \frac{1}{48dfa^3}11c_2(-4dfa^2c_2(\frac{4c_2^2}{3} + \frac{c_3}{3}) \\
& + 104dfa^2c_2c_3 + 9(\frac{4}{3}dfa^2c_2(\frac{4c_2^2}{3} + \frac{c_3}{3}) + 2dfa^2(-\frac{4}{3}c_2(2c_2^2 - 2c_3) \\
& + \frac{4c_2c_3}{3} + \frac{4c_4}{27})) - 2dfa^2(-\frac{4}{3}c_2(2c_2^2 - 2c_3) + \frac{4c_2c_3}{3} + \frac{4c_4}{27}) + 64dfa^2c_4) \\
& + \frac{-\frac{929c_2^4}{81} - 19c_2^2c_3 + \frac{88c_3^2}{9} + \frac{1615c_2c_4}{81} - \frac{515c_5}{81}}{dfa} + \frac{1}{16dfa^3}(-6dfa^2(\frac{4c_2^2}{3} \\
& + \frac{c_3}{3})c_3 + 81dfa^2c_3^2 - 4dfa^2c_2(-\frac{4}{3}c_2(2c_2^2 - 2c_3) + \frac{4c_2c_3}{3} + \frac{4c_4}{27}) \\
& + \frac{416}{3}dfa^2c_2c_4 + 9(dfa^2(\frac{4c_2^2}{3} + \frac{c_3}{3})^2 + \frac{4}{3}dfa^2c_2(-\frac{4}{3}c_2(2c_2^2 - 2c_3) \\
& + \frac{4c_2c_3}{3} + \frac{4c_4}{27}) + 2dfa^2(3(\frac{4c_2^2}{9} - \frac{4}{9}(2c_2^2 - 2c_3))c_3 - \frac{4}{3}c_2(-4c_2^3 + 7c_2c_3 \\
& - 3c_4) + \frac{8c_2c_4}{9} + \frac{5c_5}{81})) - 2dfa^2(3(\frac{4c_2^2}{9} - \frac{4}{9}(2c_2^2 - 2c_3))c_3 - \frac{4}{3}c_2(-4c_2^3
\end{aligned}$$

$$\begin{aligned} & + 7c_2c_3 - 3c_4) + \frac{8c_2c_4}{9} + \frac{5c_5}{81}) + 80dfa^2c_5))))e^6 \\ & + O[e]^7 \end{aligned}$$

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