$$\zeta_{1,1} = -\frac{\xi^3 \Delta t^3}{12 e} + \frac{\xi \Delta t}{e} + \frac{2}{e}$$

$$\zeta_{1,2} = -\frac{\xi^2 \Delta t}{e}$$

$$\zeta_{1,3} = -\frac{1}{24 e \tau_5 - 12 e}\left(20\left(e^2\left(\left(-1+\tau_2+\frac{\tau_8}{5}\right)\tau_5^2+\left(\left(\frac{6\tau_8}{5}-2\right)\tau_2+\frac{19}{10}-\frac{6\tau_8}{5}\right)\tau_5+\left(\frac{1}{2}-\frac{3\tau_8}{5}\right)\tau_2-\frac{9}{20}+\frac{\tau_8}{2}\right)\xi\Delta t^3\right.\right.$$
$$+\left(\frac{12\left(\tau_5^2+\left(\tau_8-\frac{3}{2}\right)\tau_5-\frac{\tau_8}{2}+\frac{1}{4}\right)\left(\tau_2-\frac{1}{2}\right)\xi}{5}-\frac{e^2\left(\tau_5-\frac{1}{2}\right)}{5}\right)\Delta t^2+\left(\left(-\frac{12\tau_5^2}{5}+\left(\frac{18}{5}-\frac{12\tau_2}{5}-\frac{12\tau_8}{5}\right)\tau_5+\frac{6\tau_2}{5}+\frac{6\tau_8}{5}-\frac{3}{5}\right)\xi+\frac{3}{5}-\frac{6\tau_5}{5}\right)\Delta t$$
$$\left.\left.-\frac{12\tau_5}{5}+\frac{6}{5}\right)\xi^2\right)$$

$$\zeta_{1,4} = -\frac{1}{3e\left(-4+\frac{e^2\left(3\tau_2+3\tau_8-5\right)\Delta t^2}{3}+\left(4\tau_2-2\right)\Delta t\right)\left(2\tau_5-1\right)^2\left(-\tau_8+\tau_2\right)}\left(10\xi^2\left(e^4\xi\left(\left(\tau_2^2+\left(-2\tau_8+\frac{1}{3}\right)\tau_2+\tau_8^2+\frac{5\tau_8}{3}-\frac{5}{3}\right)\left(-1+\tau_2\right.\right.\right.\right.$$
$$\left.+\frac{\tau_8}{5}\right)\tau_5^3+\left(\left(\frac{6\tau_8}{5}-\frac{5}{2}\right)\tau_2^3+\left(\frac{111}{20}+\frac{24}{5}\tau_8^2-\frac{63}{10}\tau_8\right)\tau_2^2+\left(\frac{241}{30}\tau_8+\frac{6}{5}\tau_8^3-\frac{23}{2}\tau_8^2-\frac{7}{3}\right)\tau_2+\frac{373\tau_8^2}{60}-\frac{7\tau_8}{3}-\frac{5}{6}-\frac{13\tau_8^3}{10}\right)\tau_5^2+\left(\left(-\frac{6\tau_8}{5}\right.\right.$$
$$\left.+\frac{3}{2}\right)\tau_2^3+\left(-\frac{62}{15}-\frac{24}{5}\tau_8^2+\frac{71}{10}\tau_8\right)\tau_2^2+\left(-\frac{6}{5}\tau_8^3+\frac{107}{10}\tau_8^2+\frac{11}{4}-\frac{143}{15}\tau_8\right)\tau_2-\frac{16\tau_8^2}{3}+\frac{37\tau_8}{12}+\frac{11\tau_8^3}{10}\right)\tau_5+\left(-\frac{1}{4}+\frac{3\tau_8}{10}\right)\tau_2^3+\left(\frac{79}{120}+\frac{6}{5}\tau_8^2\right.$$
$$\left.-\frac{7}{4}\tau_8\right)\tau_2^2+\left(\frac{9}{4}\tau_8-\frac{1}{3}+\frac{3}{10}\tau_8^3-\frac{51}{20}\tau_8^2\right)\tau_2-\frac{\tau_8^3}{4}-\frac{2\tau_8}{3}-\frac{5}{48}+\frac{143\tau_8^2}{120}\Delta t^5+\frac{1}{5}\left(3e^2\left(\frac{1}{3}\left(32\left(\tau_2-\frac{1}{2}\right)\left(\left(\tau_2^2+\left(-\frac{5\tau_8}{4}+\frac{1}{8}\right)\tau_2+\frac{\tau_8^2}{4}\right.\right.\right.\right.$$
$$\left.+\frac{11\tau_8}{8}-\frac{5}{4}\right)\tau_5^3+\left(\left(\frac{9\tau_8}{8}-\frac{37}{16}\right)\tau_2^2+\left(3\tau_8^2-\frac{29}{8}\tau_8+\frac{17}{8}\right)\tau_2+\frac{5}{8}+\frac{17\tau_8}{8}+\frac{3\tau_8^3}{8}-\frac{61\tau_8^2}{16}\right)\tau_5^2+\left(\left(-\frac{9\tau_8}{8}+\frac{21}{16}\right)\tau_2^2+\left(-3\tau_8^2+\frac{67}{16}\tau_8-\frac{53}{32}\right)\tau_2$$
$$\left.\left.+\frac{7\tau_8^2}{2}-\frac{3\tau_8^3}{8}-\frac{87\tau_8}{32}\right)\tau_5+\left(-\frac{13}{64}+\frac{9\tau_8}{32}\right)\tau_2^2+\left(\frac{13}{64}+\frac{3}{4}\tau_8^2-\frac{33}{32}\tau_8\right)\tau_2+\frac{41\tau_8}{64}+\frac{3\tau_8^3}{32}-\frac{53\tau_8^2}{64}+\frac{5}{64}\right)\xi\right)+e^2\left(\tau_5-\frac{1}{2}\right)^2\left(\tau_2+\tau_8-\frac{5}{3}\right)^2\Delta t^4\Bigg)$$
$$+\left(\frac{1}{20}\left(\left(\left(192\tau_2^3+\left(-128e^2-192\tau_8\right)\tau_2^2+\left(160e^2\tau_8-16e^2+192\tau_8-144\right)\tau_2-32e^2\tau_8^2-176e^2\tau_8+160e^2-48\tau_8+48\right)\tau_5^3+\left(\left(-48e^2+192\tau_8\right.\right.\right.\right.$$
$$\left.-384\right)\tau_2^3+\left(-144e^2\tau_8+376e^2+384\tau_8^2-576\tau_8+288\right)\tau_2^2+\left(-336e^2\tau_8^2+384e^2\tau_8-272e^2-384\tau_8^2+432\tau_8\right)\tau_2-48e^2\tau_8^3+\left(488e^2+96\right)\tau_8^2+\left(\right.$$
$$\left.-272e^2-96\right)\tau_8-80e^2-24\Big)\tau_5^2+\left(\left(48e^2-192\tau_8+192\right)\tau_2^3+\left(144e^2\tau_8-248e^2-384\tau_8^2+672\tau_8-192\right)\tau_2^2+\left(336e^2\tau_8^2-456e^2\tau_8+212e^2+384\tau_8^2\right.\right.$$
$$\left.-528\tau_8+48\right)\tau_2+48e^2\tau_8^3-448e^2\tau_8^2+348e^2\tau_8-96\tau_8^2+120\tau_8\Big)\tau_5+\left(-12e^2+48\tau_8-24\right)\tau_2^3+\left(-36e^2\tau_8+46e^2+96\tau_8^2-168\tau_8+12\right)\tau_2^2+\left(\right.$$
$$\left.-84e^2\tau_8^2+112e^2\tau_8-26e^2-96\tau_8^2+132\tau_8+6\right)\tau_2-12e^2\tau_8^3+\left(106e^2+24\right)\tau_8^2+\left(-82e^2-30\right)\tau_8-10e^2-3\Big)\xi\Big)$$
$$+\frac{18e^2\left(\tau_5-\frac{1}{2}\right)^2\left(\tau_2+\tau_8-\frac{5}{3}\right)\left(\tau_2+\frac{\tau_8}{3}-\frac{2}{3}\right)}{5}\Bigg)\Delta t^3+\Bigg(-\frac{96\left(\tau_2-\frac{1}{2}\right)\xi\left(-\tau_8+\tau_2+1\right)\tau_5^3}{5}+\frac{1}{5}\Big(\Big(-48\xi\tau_2^3+\Big(\left(-48\tau_8+216\right)\xi-12e^2$$
$$+24\Big)\tau_2^2+\Big(\left(-192\tau_8^2+216\tau_8-48\right)\xi-4e^2+24\tau_8-36\Big)\tau_2+\left(96\tau_8^2-96\tau_8-24\right)\xi+12e^2\tau_8^2-44e^2\tau_8+40e^2-12\tau_8+12\Big)\tau_5^2\Big)+\frac{1}{5}\Big(\Big(48\xi\tau_2^3$$
$$+\Big(\left(48\tau_8-120\right)\xi+12e^2-24\Big)\tau_2^2+\Big(\left(192\tau_8^2-264\tau_8+48\right)\xi+4e^2-24\tau_8+36\Big)\tau_2+\left(-96\tau_8^2+120\tau_8\right)\xi-12e^2\tau_8^2+44e^2\tau_8-40e^2+12\tau_8-12\Big)$$
$$\tau_5\Big)-\frac{12\xi\tau_2^3}{5}+\frac{\Big(\left(-12\tau_8+18\right)\xi-3e^2+6\Big)\tau_2^2}{5}+\frac{\Big(\left(-48\tau_8^2+66\tau_8\right)\xi-e^2+6\tau_8-9\Big)\tau_2}{5}+\frac{\left(24\tau_8^2-30\tau_8-3\right)\xi}{5}+\frac{3e^2\tau_8^2}{5}-\frac{11e^2\tau_8}{5}+2e^2-\frac{3\tau_8}{5}$$
$$+\frac{3}{5}\Bigg)\Delta t^2+\Bigg(\frac{48\xi\left(-\tau_8+\tau_2+1\right)\tau_5^3}{5}+\frac{\Big(\left(48\tau_2^2+96\tau_8^2-96\tau_2-96\tau_8-24\right)\xi-48\tau_2^2+\left(48\tau_8-48\right)\tau_2-48\tau_8+48\Big)\tau_5^2}{5}$$
$$+\frac{\Big(\left(-48\tau_2^2-96\tau_8^2+48\tau_2+120\tau_8\right)\xi+48\tau_2^2+\left(-48\tau_8+48\right)\tau_2+48\tau_8-48\Big)\tau_5}{5}+\frac{\left(12\tau_2^2+24\tau_8^2-6\tau_2-30\tau_8-3\right)\xi}{5}-\frac{12\tau_2^2}{5}+\frac{\left(12\tau_8-12\right)\tau_2}{5}$$
$$\left.-\frac{12\tau_8}{5}+\frac{12}{5}\right)\Delta t+\frac{12\left(2\tau_5-1\right)^2\left(-\tau_8+\tau_2+1\right)}{5}\Bigg)\Bigg)$$

$$\zeta_{2,1} = -\frac{5\left(-\frac{12}{5}+e^2\left(-1+\tau_2+\frac{\tau_8}{5}\right)\Delta t^2+\left(\frac{12\tau_2}{5}-\frac{6}{5}\right)\Delta t\right)\tau_5\left(1+\left(\tau_5^2-\tau_5-\frac{1}{12}\right)\left(\tau_5-\frac{1}{2}\right)\xi^3\Delta t^3+\xi^2\tau_5\left(\tau_5-1\right)\Delta t^2+\left(\tau_5-\frac{1}{2}\right)\xi\Delta t\right)}{e^3\left(\tau_5-\frac{1}{2}\right)\Delta t^2\left(-\tau_8+\tau_2\right)}$$

$$\zeta_{2,2} = \frac{20\left(-\frac{12}{5}+e^2\left(-1+\tau_2+\frac{\tau_8}{5}\right)\Delta t^2+\left(\frac{12\tau_2}{5}-\frac{6}{5}\right)\Delta t\right)\tau_5\left(\xi\tau_5\left(\tau_5-1\right)\Delta t+\frac{\tau_5}{2}-\frac{1}{4}\right)\xi^2}{\Delta t\left(-\tau_8+\tau_2\right)\left(2\tau_5-1\right)e^3}$$

$$\zeta_{2,3} = -\frac{1}{3\Delta t\left(-\tau_8+\tau_2\right)\left(2\tau_5-1\right)e^3}\left(10\left(e^4\left(\left(\left(\tau_2^2+\left(\frac{14\tau_3}{5}+\frac{18\tau_8}{5}-5\right)\tau_2+\left(-2-\frac{2\tau_8}{5}\right)\tau_3+\frac{\tau_8^2}{5}-\frac{13\tau_8}{5}+3\right)\tau_5^2+\left(\left(\frac{6\tau_8}{5}-2\right)\tau_2^2+\left(\frac{9}{5}\tau_3^2+\frac{23}{4}\right.\right.\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\left.\left.+\frac{6}{5}\tau_8^2-6\tau_8-\frac{23}{5}\tau_3\right)\tau_2+\left(-1-\frac{3\tau_8}{5}\right)\tau_3^2+\left(\tau_8+3\right)\tau_3-\frac{6\tau_8^2}{5}-\frac{11}{4}+\frac{71\tau_8}{20}\right)\tau_5+\left(\frac{1}{2}-\frac{3\tau_8}{5}\right)\tau_2^2+\left(-\frac{3}{5}\tau_8^2+\frac{9}{5}\tau_8-\frac{9}{10}\tau_3^2+\frac{27}{20}\tau_3-1\right)\tau_2\right.\right.\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\left.+\left(\frac{3\tau_8}{10}+\frac{1}{2}\right)\tau_3^2+\left(-\frac{9\tau_8}{20}-\frac{3}{4}\right)\tau_3+\frac{1}{4}+\frac{\tau_8^2}{2}-\frac{4\tau_8}{5}\right)\xi\Delta t^4+\frac{1}{5}\left(9e^2\left(\left(\left(\left(-\frac{25}{18}+\frac{4\tau_8}{3}+\tau_3\right)\tau_2+\left(-\frac{5}{9}-\frac{\tau_8}{3}\right)\tau_3-\frac{13\tau_8}{18}+\frac{5}{6}\right)\tau_5+\left(\frac{5}{9}\right.\right.\right.\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\left.\left.-\frac{2\tau_8}{3}-\frac{\tau_3}{2}\right)\tau_2+\left(\frac{\tau_8}{6}+\frac{5}{18}\right)\tau_3-\frac{5}{18}+\frac{\tau_8}{3}\right)e^2+\frac{1}{3}\left(4\left(\left(\tau_2^2+\left(3\tau_3+3\tau_8-\frac{3}{2}\right)\tau_2+\left(-\tau_8-1\right)\tau_3-\frac{\tau_8}{2}-1\right)\tau_5^2+\left(\left(\tau_8-\frac{3}{2}\right)\tau_2^2+\left(2\tau_3^2+\frac{9}{8}\right.\right.\right.\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\left.\left.+\tau_8^2-5\tau_8-\frac{15}{4}\tau_3\right)\tau_2+\left(-\frac{1}{2}-\tau_8\right)\tau_3^2+\left(\frac{1}{4}+\frac{9\tau_8}{4}\right)\tau_3-\frac{\tau_8^2}{2}+\frac{7}{4}+\frac{7\tau_8}{8}\right)\tau_5+\left(-\frac{\tau_8}{2}+\frac{1}{4}\right)\tau_2^2+\left(-\frac{1}{2}\tau_8^2+\frac{3}{2}\tau_8+\frac{1}{4}\tau_3^2-\frac{3}{8}\tau_3\right)\tau_2+\left(\frac{3\tau_8}{4}\right.\right.\right.\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\left.\left.-1\right)\tau_3^2+\left(-\frac{9\tau_8}{8}+\frac{3}{2}\right)\tau_3-\frac{1}{2}+\frac{\tau_8^2}{4}-\frac{\tau_8}{4}\right)\xi\right)\right)\Delta t^3\right)+\left(\left(\left(\left(\left(\left(\frac{36}{5}-\frac{24\tau_2}{5}-\frac{24\tau_3}{5}-\frac{24\tau_8}{5}\right)\tau_5^2+\left(-\frac{33}{5}+\frac{36}{5}\tau_3+\frac{36}{5}\tau_2-\frac{12}{5}\tau_2^2-\frac{12}{5}\tau_3^2-\frac{12}{5}\tau_8^2\right.\right.\right.\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\left.\left.+\frac{36}{5}\tau_8\right)\tau_5+\frac{3}{5}+\frac{6\tau_2^2}{5}-\frac{9\tau_2}{5}+\frac{6\tau_3^2}{5}-\frac{9\tau_8}{5}+\frac{6\tau_8^2}{5}-\frac{9\tau_3}{5}\right)\xi+\left(\left(-\frac{9}{5}+\frac{24\tau_8}{5}+\frac{24\tau_3}{5}\right)\tau_2+\left(-\frac{6}{5}-\frac{12\tau_8}{5}\right)\tau_3-\frac{6}{5}-\frac{3\tau_8}{5}\right)\tau_5+\left(-\frac{12\tau_8}{5}\right.\right.\right.\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\left.\left.+\frac{3\tau_3}{5}-\frac{6}{5}\right)\tau_2+\frac{12}{5}+\left(\frac{9\tau_8}{5}-\frac{12}{5}\right)\tau_3\right)e^2+\frac{36\left(\tau_2-\frac{1}{2}\right)\xi\left(2\tau_5^2+\left(\tau_3-\frac{5}{2}\right)\tau_5-\frac{3\tau_3}{2}+\frac{1}{2}+\tau_3^2\right)}{5}\right)\Delta t^2+\left(\left(\left(\frac{18}{5}-\frac{12\tau_2}{5}-\frac{12\tau_3}{5}-\frac{12\tau_8}{5}\right)\tau_5+\frac{6\tau_2}{5}\right.\right.\right.\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\left.\left.+\frac{6\tau_3}{5}+\frac{6\tau_8}{5}-\frac{6}{5}\right)e^2+\left(-\frac{72\tau_5^2}{5}+\left(18-\frac{36\tau_3}{5}\right)\tau_5-\frac{18}{5}-\frac{36\tau_3^2}{5}+\frac{54\tau_3}{5}\right)\xi+\frac{36\left(\tau_3+\tau_5-1\right)\left(\tau_2-\frac{1}{2}\right)}{5}\right)\Delta t-\frac{36\tau_3}{5}-\frac{36\tau_5}{5}+\frac{36}{5}\right)\tau_5\xi^2\right)$$

$$\zeta_{2,4} = -\frac{1}{3\Delta t\left(-4+e^2\left(\tau_2+\tau_8-\frac{5}{3}\right)\Delta t^2+\left(4\tau_2-2\right)\Delta t\right)e^3\left(\tau_5-\frac{1}{2}\right)^2\left(-\tau_8+\tau_2\right)}\left(5\tau_5\left(e^6\left(\left(\tau_2^3+\left(\frac{14\tau_3}{5}-3\tau_8-\frac{28}{15}\right)\tau_2^2+\left(-\frac{13\tau_8^2}{5}+\left(\frac{44}{5}\right.\right.\right.\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\left.\left.+\frac{12\tau_3}{5}\right)\tau_8-\frac{20\tau_3}{3}-\frac{1}{3}\right)\tau_2-\frac{\tau_8^3}{5}+\left(-\frac{2\tau_3}{5}+\frac{52}{15}\right)\tau_8^2+\left(-\frac{4\tau_3}{3}-7\right)\tau_8+\frac{5}{3}+\frac{10\tau_3}{3}\right)\tau_5^3+\left(\left(\frac{6\tau_8}{5}-\frac{5}{2}\right)\tau_2^3+\left(\frac{9}{5}\tau_3^2+\frac{6}{5}\tau_8^2-6\tau_3-\frac{3}{10}\tau_8\right.\right.\right.\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\left.\left.+\frac{751}{120}\right)\tau_2^2+\left(-\frac{6\tau_8^3}{5}+\frac{43\tau_8^2}{10}+\left(-\frac{581}{60}+\frac{6}{5}\tau_3^2-\frac{24}{5}\tau_3\right)\tau_8-4\tau_3^2+14\tau_3-\frac{5}{2}\right)\tau_2+\frac{13\tau_8^3}{10}+\left(-\frac{3}{5}\tau_3^2+\frac{6}{5}\tau_3-\frac{809}{120}\right)\tau_8^2+\left(\frac{65}{6}+2\tau_3\right)\tau_8\right.\right.\right.\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\left.\left.-\frac{20\tau_3}{3}-\frac{25}{12}+\frac{5\tau_3^2}{3}\right)\tau_5^2+\left(\left(-\frac{6\tau_8}{5}+\frac{3}{2}\right)\tau_2^3+\left(-\frac{9}{5}\tau_3^2-\frac{6}{5}\tau_8^2+\frac{73}{20}\tau_3+\frac{5}{2}\tau_8-\frac{61}{15}\right)\tau_2^2+\left(\frac{6\tau_8^3}{5}-\frac{21\tau_8^2}{10}+\left(\frac{29}{10}-\frac{6}{5}\tau_3^2+\frac{27}{10}\tau_3\right)\tau_8+4\tau_3^2+2\right.\right.\right.\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\left.\left.-\frac{25\tau_3}{3}\right)\tau_2-\frac{11\tau_8^3}{10}+\left(-\frac{19}{20}\tau_3+\frac{3}{5}\tau_3^2+\frac{23}{6}\right)\tau_8^2+\left(-\frac{2\tau_3}{3}-\frac{16}{3}\right)\tau_8-\frac{5\tau_3^2}{3}+\frac{25}{24}+\frac{15\tau_3}{4}\right)\tau_5+\left(-\frac{1}{4}+\frac{3\tau_8}{10}\right)\tau_2^3+\left(\frac{9}{20}\tau_3^2-\frac{27}{40}\tau_3-\frac{4}{5}\tau_8\right.\right.\right.\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\left.\left.+\frac{3}{10}\tau_8^2+\frac{13}{20}\right)\tau_2^2+\left(-\frac{3\tau_8^3}{10}+\frac{3\tau_8^2}{10}+\left(\frac{3}{10}\tau_3^2-\frac{3}{20}-\frac{9}{20}\tau_3\right)\tau_8-\tau_3^2+\frac{3\tau_3}{2}-\frac{11}{48}\right)\tau_2+\frac{\tau_8^3}{4}+\left(-\frac{2}{3}+\frac{9}{40}\tau_3-\frac{3}{20}\tau_3^2\right)\tau_8^2+\frac{41\tau_8}{48}-\frac{25}{96}-\frac{5\tau_3}{8}\right.\right.\right.\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\left.\left.+\frac{5\tau_3^2}{12}\right)\xi\Delta t^6+\frac{1}{5}\left(9e^4\left(\left(\tau_2+\tau_8-\frac{5}{3}\right)\left(\left(\tau_3-\frac{2\tau_8}{3}-\frac{1}{9}\right)\tau_2+\left(-\frac{\tau_3}{3}+1\right)\tau_8-\frac{5\tau_3}{9}-\frac{5}{18}\right)\left(\tau_5-\frac{1}{2}\right)^2e^2+\frac{1}{9}\left(32\left(\left(\tau_2^3+\left(\frac{23\tau_3}{8}-3\tau_8\right.\right.\right.\right.\right.\right.\right.$$

$$-\frac{1}{4}\Big)\tau_2^{\,2}+\Big(-\tau_8^{\,2}+\Big(\frac{57}{8}+\frac{\tau_3}{2}\Big)\tau_8-\frac{35\,\tau_3}{8}-\frac{51}{16}\Big)\tau_2+\Big(-\frac{3\,\tau_3}{8}+\frac{7}{8}\Big)\tau_8^{\,2}+\Big(\frac{3\,\tau_3}{8}-\frac{61}{16}\Big)\tau_8+\frac{35}{16}+\frac{5\,\tau_3}{4}\Big)\tau_5^{\,3}+\Big(\Big(\frac{9\,\tau_8}{8}-\frac{37}{16}\Big)\tau_2^{\,3}+\Big(\frac{15}{8}\,\tau_3^{\,2}-\frac{183}{32}\,\tau_3$$

$$+2\,\tau_8+\frac{133}{64}\Big)\tau_2^{\,2}+\Big(-\frac{3\,\tau_8^{\,3}}{8}+\frac{17\,\tau_8^{\,2}}{8}+\Big(-\frac{157}{16}-\frac{3\,\tau_3}{16}\Big)\tau_8-\frac{21\,\tau_3^{\,2}}{8}+\frac{127\,\tau_3}{16}+\frac{135}{32}\Big)\tau_2+\frac{3\,\tau_8^{\,3}}{16}+\Big(-\frac{3}{8}\,\tau_3^{\,2}+\frac{33}{32}\,\tau_3-\frac{113}{64}\Big)\tau_8^{\,2}+\Big(\frac{195}{32}+\frac{5}{8}\,\tau_3^{\,2}$$

$$-\frac{29}{16}\,\tau_3\Big)\tau_8-\frac{55\,\tau_3}{32}-\frac{225}{64}+\frac{5\,\tau_3^{\,2}}{8}\Big)\tau_5^{\,2}+\Big(\Big(-\frac{9\,\tau_8}{8}+\frac{21}{16}\Big)\tau_2^{\,3}+\Big(-\frac{45}{32}\,\tau_3^{\,2}+\frac{91}{32}\,\tau_3+\frac{3}{8}\,\tau_8-\frac{185}{128}\Big)\tau_2^{\,2}+\Big(\frac{3\,\tau_8^{\,3}}{8}-\frac{5\,\tau_8^{\,2}}{4}+\Big(\frac{257}{64}+\frac{9}{16}\,\tau_3^{\,2}-\frac{7}{8}\,\tau_3\Big)\tau_8$$

$$+\frac{11\,\tau_3^{\,2}}{8}-\frac{121}{64}-\frac{95\,\tau_3}{32}\Big)\tau_2-\frac{3\,\tau_8^{\,3}}{16}+\Big(-\frac{27}{32}\,\tau_3+\frac{15}{32}\,\tau_3^{\,2}+\frac{131}{128}\Big)\tau_8^{\,2}+\Big(-\frac{5}{4}\,\tau_3^{\,2}+\frac{71}{32}\,\tau_3-\frac{189}{64}\Big)\tau_8+\frac{5\,\tau_3^{\,2}}{32}+\frac{225}{128}-\frac{5\,\tau_3}{32}\Big)\tau_5+\Big(-\frac{13}{64}+\frac{9\,\tau_8}{32}\Big)\tau_2^{\,3}$$

$$+\Big(\frac{15}{64}\,\tau_3^{\,2}-\frac{45}{128}\,\tau_3-\frac{5}{16}\,\tau_8+\frac{25}{128}\Big)\tau_2^{\,2}+\Big(-\frac{3\,\tau_8^{\,3}}{32}+\frac{7\,\tau_8^{\,2}}{32}+\Big(-\frac{9}{32}\,\tau_3^{\,2}-\frac{29}{64}+\frac{27}{64}\,\tau_3\Big)\tau_8-\frac{\tau_3^{\,2}}{32}+\frac{3\,\tau_3}{64}+\frac{89}{256}\Big)\tau_2+\frac{3\,\tau_8^{\,3}}{64}+\Big(-\frac{23}{128}+\frac{27}{128}\,\tau_3$$

$$-\frac{9}{64}\,\tau_3^{\,2}\Big)\tau_8^{\,2}+\Big(\frac{15}{32}\,\tau_3^{\,2}-\frac{45}{64}\,\tau_3+\frac{111}{256}\Big)\tau_8+\frac{45\,\tau_3}{128}-\frac{15\,\tau_3^{\,2}}{64}-\frac{75}{256}\Big)\xi\Big)\Big)\Delta t^5\Big)$$

$$-\frac{1}{5}\Bigg(12\Bigg(\Bigg(\frac{11\,\xi\Big(\tau_2^{\,2}+\Big(\frac{20\,\tau_3}{11}-\frac{24\,\tau_8}{11}-\frac{9}{11}\Big)\tau_2-\tau_8^{\,2}+\Big(\frac{4\,\tau_3}{11}+\frac{41}{11}\Big)\tau_8-\frac{20\,\tau_3}{11}-\frac{10}{11}\Big)\tau_5^{\,3}}{3}+\Big(\Big(\tau_2^{\,3}+\Big(-\frac{59}{6}+3\,\tau_8\Big)\tau_2^{\,2}+\Big(-\tau_8^{\,2}+\frac{17}{2}\,\tau_8-14\,\tau_3$$

$$+\frac{55}{6}+4\,\tau_3^{\,2}\Big)\tau_2-\tau_8^{\,3}+\frac{23\,\tau_8^{\,2}}{3}+\Big(-2\,\tau_3-\frac{125}{6}\Big)\tau_8+\frac{25}{6}-\frac{10\,\tau_3^{\,2}}{3}+\frac{40\,\tau_3}{3}\Big)\xi+\Big(-5\,\tau_3+3\,\tau_8-\frac{11}{12}\Big)\tau_2^{\,2}+\Big(\tau_8^{\,2}-\frac{49}{6}\,\tau_8+7\,\tau_3+\frac{17}{4}\Big)\tau_2+\Big(\tau_3$$

$$-\frac{5}{4}\Big)\tau_8^{\,2}+\Big(-\frac{5\,\tau_3}{3}+\frac{61}{12}\Big)\tau_8-\frac{5\,\tau_3}{3}-\frac{35}{12}\Big)\tau_5^{\,2}+\Big(\Big(-\tau_2^{\,3}+\Big(\frac{77}{12}-3\,\tau_8\Big)\tau_2^{\,2}+\Big(\tau_8^{\,2}-\frac{13}{6}\,\tau_8+\frac{25}{3}\,\tau_3-\frac{23}{4}-4\,\tau_3^{\,2}\Big)\tau_2+\tau_8^{\,3}-\frac{55\,\tau_8^{\,2}}{12}+\Big(\frac{2\,\tau_3}{3}+\frac{119}{12}\Big)\tau_8$$

$$-\frac{25}{12}+\frac{10\,\tau_3^{\,2}}{3}-\frac{15\,\tau_3}{2}\Big)\xi+\Big(\frac{15\,\tau_3}{4}-3\,\tau_8+\frac{37}{24}\Big)\tau_2^{\,2}+\Big(-\tau_8^{\,2}+\Big(\frac{107}{12}-\frac{3\,\tau_3}{2}\Big)\tau_8-\frac{11\,\tau_3}{3}-\frac{71}{12}\Big)\tau_2+\Big(\frac{11}{8}-\frac{5\,\tau_3}{4}\Big)\tau_8^{\,2}+\Big(\frac{10\,\tau_3}{3}-\frac{71}{12}\Big)\tau_8-\frac{5\,\tau_3}{12}$$

$$+\frac{95}{24}\Big)\tau_5+\Big(\frac{\tau_2^{\,3}}{4}+\Big(-\frac{29}{24}+\frac{3\,\tau_8}{4}\Big)\tau_2^{\,2}+\Big(-\frac{1}{4}\,\tau_8^{\,2}-\frac{1}{24}\,\tau_8-\frac{3}{2}\,\tau_3+\frac{41}{48}+\tau_3^{\,2}\Big)\tau_2+\frac{25}{48}-\frac{\tau_8^{\,3}}{4}-\frac{5\,\tau_3^{\,2}}{6}-\frac{71\,\tau_8}{48}+\frac{5\,\tau_8^{\,2}}{6}+\frac{5\,\tau_3}{4}\Big)\xi+\Big(\frac{3\,\tau_8}{4}-\frac{5\,\tau_3}{8}$$

$$-\frac{13}{24}\Big)\tau_2^{\,2}+\Big(\frac{\tau_8^{\,2}}{4}+\Big(\frac{3\,\tau_3}{4}-\frac{29}{12}\Big)\tau_8+\frac{\tau_3}{12}+\frac{91}{48}\Big)\tau_2+\Big(\frac{3\,\tau_3}{8}-\frac{3}{8}\Big)\tau_8^{\,2}+\Big(-\frac{5\,\tau_3}{4}+\frac{27}{16}\Big)\tau_8+\frac{5\,\tau_3}{8}-\frac{5}{4}\Big)e^2-4\Big(\Big(\tau_2^{\,2}+\big(3\,\tau_3-3\,\tau_8+4\big)\tau_2+\big(-\tau_3$$

$$+4\big)\tau_8-\frac{11}{2}-\tau_3\Big)\tau_5^{\,3}+\Big(\big(\tau_8-2\big)\tau_2^{\,2}+\Big(2\,\tau_3^{\,2}-\frac{1}{2}\,\tau_8^{\,2}-\frac{9}{2}\,\tau_3+\frac{7}{2}\,\tau_8-\frac{25}{4}\Big)\tau_2+\frac{\tau_8^{\,2}}{4}+\Big(-\frac{13}{2}-\tau_3^{\,2}+\frac{7}{2}\,\tau_3\Big)\tau_8-\frac{\tau_3}{2}+\frac{75}{8}-\frac{\tau_3^{\,2}}{2}\Big)\tau_5^{\,2}+\Big(\big(-\tau_8$$

$$+1\big)\tau_2^{\,2}+\Big(3+\frac{1}{2}\,\tau_8^{\,2}-\tau_8\Big)\tau_2-\frac{\tau_8^{\,2}}{4}+\Big(2\,\tau_3^{\,2}-\frac{15}{4}\,\tau_3+\frac{25}{8}\Big)\tau_8-2\,\tau_3^{\,2}-\frac{75}{16}+\frac{31\,\tau_3}{8}\Big)\tau_5+\Big(\frac{\tau_8}{4}-\frac{1}{8}\Big)\tau_2^{\,2}+\Big(-\frac{1}{8}\,\tau_8^{\,2}-\frac{1}{2}\,\tau_3^{\,2}+\frac{3}{4}\,\tau_3-\frac{15}{32}\Big)\tau_2+\frac{\tau_8^{\,2}}{16}+\Big($$

$$-\frac{3}{4}\,\tau_3^{\,2}+\frac{9}{8}\,\tau_3-\frac{7}{16}\Big)\tau_8-\frac{27\,\tau_3}{16}+\frac{9\,\tau_3^{\,2}}{8}+\frac{45}{64}\Big)\Big(\tau_2-\frac{1}{2}\Big)\xi\Big)e^2\Delta t^4\Big)+\Bigg(-\frac{12\Big(\tau_2^{\,2}+\Big(-3\,\tau_8-\frac{3}{2}+4\,\tau_3\Big)\tau_2-2\,\tau_8^{\,2}+\frac{41\,\tau_8}{6}-\frac{10\,\tau_3}{3}-\frac{5}{3}\Big)\Big(\tau_5-\frac{1}{2}\Big)^2e^4}{5}$$

$$+\Bigg(-\frac{144\,\xi\Big(\tau_2^{\,2}+\Big(\frac{5\,\tau_3}{3}-\frac{7\,\tau_8}{3}+\frac{4}{3}\Big)\tau_2+\Big(-\frac{\tau_3}{3}+2\Big)\tau_8-\frac{2\,\tau_3}{3}-2\Big)\tau_5^{\,3}}{5}+\Bigg(\Bigg(-\frac{48\,\tau_2^{\,3}}{5}+\Big(\frac{312}{5}-\frac{48\,\tau_8}{5}\Big)\tau_2^{\,2}+\Big(-\frac{144}{5}\,\tau_3^{\,2}+\frac{408}{5}\,\tau_3+\frac{264}{5}+\frac{48}{5}\,\tau_8^{\,2}$$

$$-\frac{456}{5}\,\tau_8\Big)\tau_2-\frac{24\,\tau_8^{\,2}}{5}+\Big(\frac{456}{5}+\frac{48}{5}\,\tau_3^{\,2}-\frac{168}{5}\,\tau_3\Big)\tau_8-96+\frac{48\,\tau_3^{\,2}}{5}-\frac{72\,\tau_3}{5}\Big)\xi+\frac{96\Big(\Big(\Big(\tau_3-\frac{\tau_8}{2}+1\Big)\tau_2+\Big(-\frac{\tau_3}{2}+1\Big)\tau_8-\frac{\tau_3}{4}-\frac{11}{8}\Big)\Big(\tau_2-\frac{1}{2}\Big)\Big)}{5}\Bigg)\tau_5^{\,2}$$

$$+\Bigg(\Bigg(\frac{48\,\tau_2^{\,3}}{5}+\Big(-36+\frac{48\,\tau_8}{5}\Big)\tau_2^{\,2}+\Big(\frac{48}{5}\,\tau_3^{\,2}-\frac{108}{5}\,\tau_3-24-\frac{48}{5}\,\tau_8^{\,2}+36\,\tau_8\Big)\tau_2+\frac{24\,\tau_8^{\,2}}{5}+\Big(-\frac{216}{5}-\frac{96}{5}\,\tau_3^{\,2}+36\,\tau_3\Big)\tau_8+48+\frac{72\,\tau_3^{\,2}}{5}-\frac{132\,\tau_3}{5}\Big)\xi$$

$$+\frac{48\Big(\big(\tau_8-3\big)\tau_2+\Big(2\,\tau_3-\frac{5}{2}\Big)\tau_8-2\,\tau_3+4\Big)\Big(\tau_2-\frac{1}{2}\Big)\Big)}{5}\Bigg)\tau_5+\Bigg(-\frac{12\,\tau_2^{\,3}}{5}+\Big(6-\frac{12\,\tau_8}{5}\Big)\tau_2^{\,2}+\Big(\frac{12}{5}\,\tau_3^{\,2}-\frac{18}{5}\,\tau_3+\frac{21}{5}+\frac{12}{5}\,\tau_8^{\,2}-\frac{18}{5}\,\tau_8\Big)\tau_2-\frac{6\,\tau_8^{\,2}}{5}+\Big(6$$

$$+\frac{36}{5}\,\tau_3^{\,2}-\frac{54}{5}\,\tau_3\Big)\tau_8-\frac{15}{2}-\frac{48\,\tau_3^{\,2}}{5}+\frac{72\,\tau_3}{5}\Big)\xi-\frac{24\Big(\Big(\Big(\tau_3+\frac{\tau_8}{2}-2\Big)\tau_2+\Big(\frac{3\,\tau_3}{2}-\frac{3}{2}\Big)\tau_8-\frac{9\,\tau_3}{4}+\frac{21}{8}\Big)\Big(\tau_2-\frac{1}{2}\Big)\Big)}{5}\Bigg)e^2$$

$$+\frac{144\Big(\tau_5-\frac{1}{2}\Big)\Big(\tau_2-\frac{1}{2}\Big)^2\xi\Big(2\,\tau_5^{\,2}+\Big(\tau_3-\frac{5}{2}\Big)\tau_5-\frac{3\,\tau_3}{2}+\frac{1}{2}+\tau_3^{\,2}\Big)}{5}\Bigg)\Delta t^3+\Bigg(\Bigg(\frac{96\,\xi\Big(\tau_2-2\,\tau_8+\tau_3+\frac{1}{2}\Big)\tau_5^{\,3}}{5}+\Bigg(\Bigg(-12+\frac{48}{5}\,\tau_2^{\,2}-\frac{192}{5}\,\tau_2+\frac{48}{5}\,\tau_3^{\,2}$$

$$
\begin{aligned}
&- \frac{192}{5}\tau_3 - \frac{24}{5}\tau_8^{\,2} + \frac{288}{5}\tau_8\Big)\xi - \frac{48\tau_2^{\,2}}{5} + \left(-\frac{144\tau_3}{5} + \frac{144\tau_8}{5} - \frac{96}{5}\right)\tau_2 + \left(-\frac{144}{5} + \frac{48\tau_3}{5}\right)\tau_8 + \frac{48\tau_3}{5} + \frac{144}{5}\Big)\tau_5^{\,2} + \Bigg(\Big(6 + \frac{108}{5}\tau_3 + \frac{108}{5}\tau_2 - \frac{48}{5}\tau_2^{\,2} \\
&- \frac{48}{5}\tau_3^{\,2} + \frac{24}{5}\tau_8^{\,2} - \frac{132}{5}\tau_8\Big)\xi + \frac{48\tau_2^{\,2}}{5} + \left(\frac{144}{5} - \frac{144\tau_8}{5} + \frac{48\tau_3}{5}\right)\tau_2 + \left(-\frac{96\tau_3}{5} + \frac{168}{5}\right)\tau_8 - \frac{204}{5} + \frac{72\tau_3}{5}\Big)\tau_5 + \Big(-\frac{3}{2} + \frac{12}{5}\tau_2^{\,2} - \frac{18}{5}\tau_2 + \frac{12}{5}\tau_3^{\,2} \\
&+ \frac{18}{5}\tau_8 - \frac{6}{5}\tau_8^{\,2} - \frac{18}{5}\tau_3\Big)\xi - \frac{12\tau_2^{\,2}}{5} + \left(\frac{36\tau_8}{5} + \frac{12\tau_3}{5} - \frac{48}{5}\right)\tau_2 + \left(\frac{36\tau_3}{5} - \frac{48}{5}\right)\tau_8 - \frac{48\tau_3}{5} + \frac{66}{5}\Bigg)e^2 \\
&- \frac{288\left(2\xi\tau_5^{\,2} + \left(\left(\tau_3 - \frac{5}{2}\right)\xi - \frac{\tau_2}{2} + \frac{1}{4}\right)\tau_5 + \left(\left(-\frac{1}{2} + \tau_3\right)\xi - \frac{\tau_2}{2} + \frac{1}{4}\right)(\tau_3 - 1)\right)\left(\tau_5 - \frac{1}{2}\right)\left(\tau_2 - \frac{1}{2}\right)}{5}\Bigg)\Delta t^2 \\
&+ \frac{48\left(\left(\tau_5 - \frac{1}{2}\right)\left(\tau_2 - 2\tau_8 + \tau_3 + \frac{1}{2}\right)e^2 + 6\xi\tau_5^{\,2} + \left(\left(3\tau_3 - \frac{15}{2}\right)\xi - 6\tau_2 + 3\right)\tau_5 + 3\left(\left(-\frac{1}{2} + \tau_3\right)\xi - 2\tau_2 + 1\right)(\tau_3 - 1)\right)\left(\tau_5 - \frac{1}{2}\right)\Delta t}{5} \\
&+ \frac{144\left(\tau_3 + \tau_5 - 1\right)\left(\tau_5 - \frac{1}{2}\right)}{5}\Bigg)\xi^2\Bigg)
\end{aligned}
$$