```
> for i from 1 to 10 do
  FF||i :=
  mtaylor(expand(expand(FF)), [z,s,zb,sb,v], i+1, [1,1,1,1,2])
  -
  mtaylor(expand(expand(FF)), [z,s,zb,sb,v], i, [1,1,1,1,2]);
  od;
```

$$FF1 := 0$$

$$FF2 := z\,zb$$

$$FF3 := \frac{1}{2}\,zb^2\,s + \frac{1}{2}\,z^2\,sb$$

$$FF4 := z\,zb\,s\,sb$$

$$FF5 := \frac{1}{2}\,zb^2\,s^2\,sb + \frac{1}{2}\,s\,sb^2\,z^2$$

$$FF6 := -15\,z^3\,zb^2\,sb + z\,zb\,s^2\,sb^2 + s\,zb^5 + z^5\,sb - 15\,z^2\,s\,zb^3$$

$$\begin{aligned} FF7 := {} & \frac{3}{2}\,z^5\,sb^2 + \theta\,z^4\,zb^3 - 45\,z^2\,s\,zb^3\,sb + \frac{1}{2}\,sb^3\,s^2\,z^2 + \theta\,z^3\,zb^4 - \frac{15}{2}\,z^4\,zb\,sb^2 + 5\,z\,s\,zb^4\,sb \\ & - 10\,z^3\,zb^2\,sb^2 + \frac{3}{2}\,s^2\,zb^5 - 45\,z^3\,s\,zb^2\,sb - \frac{15}{2}\,z\,s^2\,zb^4 - 10\,z^2\,s^2\,zb^3 + \frac{1}{2}\,zb^2\,s^3\,sb^2 \\ & + 5\,z^4\,s\,zb\,sb \end{aligned}$$

$$\begin{aligned} FF8 := {} & z\,zb\,s^3\,sb^3 - 20\,z^3\,s^2\,zb^2\,sb - 75\,z^3\,s\,zb^2\,sb^2 - 75\,z^2\,s^2\,zb^3\,sb - \frac{75}{2}\,z\,s^2\,zb^4\,sb \\ & - \frac{75}{2}\,z^4\,s\,zb\,sb^2 - 20\,z^2\,s\,zb^3\,sb^2 - \frac{1}{5}\,\theta\,z^6\,zb\,sb + 2\,\theta\,z^4\,s\,zb^3 + \frac{12}{5}\,\theta\,z^5\,zb^2\,sb \\ & + 3\,\theta\,z^4\,zb^3\,sb + 2\,\theta\,z^3\,zb^4\,sb + 3\,\theta\,z^3\,s\,zb^4 + \frac{12}{5}\,\theta\,z^2\,s\,zb^5 - \frac{1}{5}\,\theta\,z\,s\,zb^6 - 5\,z^4\,zb\,sb^3 \\ & - 5\,z\,s^3\,zb^4 + 5\,s^2\,zb^5\,sb + 5\,z^5\,s\,sb^2 - \frac{1}{35}\,\theta\,s\,zb^7 - \frac{1}{35}\,\theta\,z^7\,sb - \frac{3}{2}\,z^5\,sb^3 - 130\,z^5\,zb^3 \\ & - \frac{325}{6}\,z^4\,zb^4 - 130\,z^3\,zb^5 - \frac{3}{2}\,s^3\,zb^5 \end{aligned}$$

$$\begin{aligned} FF9 := {} & \theta\,z^3\,zb^4\,sb^2 + \theta\,z^4\,s^2\,zb^3 - 165\,z^2\,s^2\,zb^3\,sb^2 - 40\,z^3\,s\,zb^2\,sb^3 - 165\,z^3\,s^2\,zb^2\,sb^2 \\ & - 5\,z^4\,s^2\,zb\,sb^2 - 5\,z\,s^2\,zb^4\,sb^2 - \frac{75}{2}\,z^4\,s\,zb\,sb^3 - \frac{75}{2}\,z\,s^3\,zb^4\,sb - 40\,z^2\,s^3\,zb^3\,sb \\ & + \frac{18}{5}\,\theta\,z^5\,zb^2\,sb^2 + 3\,\theta\,z^4\,zb^3\,sb^2 + 2\,\theta\,z^6\,zb\,sb^2 + \frac{18}{5}\,\theta\,z^2\,s^2\,zb^5 + 2\,\theta\,z\,s^2\,zb^6 \\ & + 3\,\theta\,z^3\,s^2\,zb^4 - 5\,\mathrm{I}\,z^6\,sb\,v + 5\,\mathrm{I}\,s\,zb^6\,v + \frac{24}{5}\,\theta\,z^2\,s\,zb^5\,sb + 12\,\theta\,z^4\,s\,zb^3\,sb \\ & + \frac{24}{5}\,\theta\,z^5\,s\,zb^2\,sb + 12\,\theta\,z^3\,s\,zb^4\,sb - \frac{1}{5}\,\theta\,z\,s\,zb^6\,sb - \frac{1}{5}\,\theta\,z^6\,s\,zb\,sb - 100\,\mathrm{I}\,z^3\,zb^3\,sb\,v \end{aligned}$$

$$- 30\,\mathrm{I}\,z^5\,zb\,sb\,v - 75\,\mathrm{I}\,z^4\,zb^2\,sb\,v - \frac{335}{3}\,z^5\,zb^3\,sb + 5\,z\,s\,zb^7 - \frac{6}{35}\,\theta\,s^2\,zb^7 - \frac{335}{3}\,z^3\,s\,zb^5$$
$$+ \frac{1}{2}\,sb^4\,s^3\,z^2 + \frac{475}{2}\,z^4\,zb^4\,sb - 455\,z^2\,s\,zb^6 - \frac{6}{25}\,\theta^2\,z^5\,zb^4 - 190\,z^5\,s\,zb^3 - \frac{6}{35}\,\theta\,z^7\,sb^2$$
$$+ \frac{1}{2}\,zb^2\,s^4\,sb^3 - 455\,z^6\,zb^2\,sb + 5\,z^7\,zb\,sb - \frac{6}{25}\,\theta^2\,z^4\,zb^5 - 190\,z^3\,zb^5\,sb - \frac{4}{25}\,\theta^2\,z^6\,zb^3$$
$$- \frac{4}{25}\,\theta^2\,z^3\,zb^6 - \frac{15}{2}\,z^5\,s\,sb^3 - \frac{15}{2}\,s^3\,zb^5\,sb - z^5\,sb^4 - s^4\,zb^5 + \frac{25}{4}\,s\,zb^8 + \frac{25}{4}\,z^8\,sb$$
$$+ 30\,\mathrm{I}\,z\,s\,zb^5\,v + 100\,\mathrm{I}\,z^3\,s\,zb^3\,v + 75\,\mathrm{I}\,z^2\,s\,zb^4\,v + \frac{475}{2}\,z^4\,s\,zb^4$$

$$FF10 := z\,zb\,s^4\,sb^4 + \theta\,z^3\,s^3\,zb^4 + \theta\,z^4\,zb^3\,sb^3 - 210\,z^3\,s^2\,zb^2\,sb^3 - 20\,z^4\,s\,zb\,sb^4 + 105\,z^5\,s\,zb^3\,sb \tag{1}$$
$$- 210\,z^2\,s^3\,zb^3\,sb^2 - \frac{1525}{2}\,z^2\,s\,zb^6\,sb - \frac{1525}{2}\,z^6\,s\,zb^2\,sb - \frac{255}{2}\,z^4\,s^2\,zb\,sb^3$$
$$+ 1725\,z^4\,s\,zb^4\,sb - 20\,z\,s^4\,zb^4\,sb - 70\,z^3\,s^3\,zb^2\,sb^2 - \frac{255}{2}\,z\,s^3\,zb^4\,sb^2 - 70\,z^2\,s^2\,zb^3\,sb^3$$
$$+ 105\,z^3\,s\,zb^5\,sb + 50\,z^7\,s\,zb\,sb + 50\,z\,s\,zb^7\,sb + \frac{3}{175}\,\theta^2\,z\,s\,zb^8 + \frac{3}{175}\,\theta^2\,z^8\,zb\,sb$$
$$- \frac{4}{5}\,\theta^2\,z^3\,s\,zb^6 + 2\,\theta\,z\,s^3\,zb^6 + 2\,\theta\,z^6\,zb\,sb^3 + \frac{12}{5}\,\theta\,z^5\,zb^2\,sb^3 - \frac{18}{25}\,\theta^2\,z^5\,s\,zb^4$$
$$- \frac{8}{25}\,\theta^2\,z^6\,s\,zb^3 - \frac{18}{25}\,\theta^2\,z^4\,zb^5\,sb - \frac{8}{25}\,\theta^2\,z^3\,zb^6\,sb - \frac{72}{175}\,\theta^2\,z^2\,s\,zb^7 - \frac{4}{5}\,\theta^2\,z^6\,zb^3\,sb$$
$$- \frac{24}{25}\,\theta^2\,z^5\,zb^4\,sb - \frac{24}{25}\,\theta^2\,z^4\,s\,zb^5 + \frac{12}{5}\,\theta\,z^2\,s^3\,zb^5 - \frac{72}{175}\,\theta^2\,z^7\,zb^2\,sb - \frac{1}{5}\,\theta\,s^2\,zb^7\,sb$$
$$- \frac{1}{5}\,\theta\,z^7\,s\,sb^2 - 20\,\mathrm{I}\,z^6\,sb^2\,v + 20\,\mathrm{I}\,s^2\,zb^6\,v + 24\,\theta\,z^3\,s^2\,zb^4\,sb + \frac{18}{5}\,\theta\,z^6\,s\,zb\,sb^2$$
$$+ \frac{12}{5}\,\theta\,z^2\,s\,zb^5\,sb^2 + \frac{18}{5}\,\theta\,z\,s^2\,zb^6\,sb + 15\,\theta\,z^4\,s^2\,zb^3\,sb + 15\,\theta\,z^3\,s\,zb^4\,sb^2$$
$$+ \frac{12}{5}\,\theta\,z^5\,s^2\,zb^2\,sb + 18\,\theta\,z^2\,s^2\,zb^5\,sb + 18\,\theta\,z^5\,s\,zb^2\,sb^2 + 24\,\theta\,z^4\,s\,zb^3\,sb^2$$
$$- 150\,\mathrm{I}\,z^4\,zb^2\,sb^2\,v - 16\,\mathrm{I}\,\theta\,z^3\,zb^5\,v - 100\,\mathrm{I}\,z^3\,zb^3\,sb^2\,v - 90\,\mathrm{I}\,z^5\,zb\,sb^2\,v + F_{5,0,5,0,0}\,z^5\,zb^5$$
$$- \frac{15}{2}\,z^5\,s\,sb^4 + 5\,s^3\,zb^5\,sb^2 + 5\,z^5\,s^2\,sb^3 - 150\,z^5\,s^2\,zb^3 + \frac{975}{2}\,z^4\,s^2\,zb^4 + 570\,z^3\,s^2\,zb^5$$
$$- 325\,z^2\,s^2\,zb^6 - 435\,z\,s^2\,zb^7 - 435\,z^7\,zb\,sb^2 - 325\,z^6\,zb^2\,sb^2 - \frac{15}{2}\,s^4\,zb^5\,sb$$
$$+ 570\,z^5\,zb^3\,sb^2 + \frac{975}{2}\,z^4\,zb^4\,sb^2 - 150\,z^3\,zb^5\,sb^2 + 9\,\theta\,z^4\,zb^6 + \frac{164}{7}\,\theta\,z^3\,zb^7 + \frac{4}{7}\,\theta\,s^3\,zb^7$$
$$+ \frac{1}{525}\,\theta^2\,s\,zb^9 + \frac{4}{7}\,\theta\,z^7\,sb^3 + \frac{1}{525}\,\theta^2\,z^9\,sb + 9\,\theta\,z^6\,zb^4 + \frac{164}{7}\,\theta\,z^7\,zb^3 + \frac{95}{4}\,s^2\,zb^8$$
$$+ \frac{95}{4}\,z^8\,sb^2 + 90\,\mathrm{I}\,z\,s^2\,zb^5\,v + 100\,\mathrm{I}\,z^3\,s^2\,zb^3\,v + 150\,\mathrm{I}\,z^2\,s^2\,zb^4\,v + 16\,\mathrm{I}\,\theta\,z^5\,zb^3\,v$$
$$- 30\,\mathrm{I}\,z^5\,s\,zb\,sb\,v - 150\,\mathrm{I}\,z^2\,s\,zb^4\,sb\,v + 150\,\mathrm{I}\,z^4\,s\,zb^2\,sb\,v + 30\,\mathrm{I}\,z\,s\,zb^5\,sb\,v$$

```
> for i from 0 to 8 do
  AA||i :=
  mtaylor(expand(expand(AA)), [z,s,w], i+1, [1,1,2])
  -
  mtaylor(expand(expand(AA)), [z,s,w], i, [1,1,2]);
  od;
```

$$AA0 := a + \mathrm{I}\, b$$

$$AA1 := (-c + \mathrm{I}\, d)\, z + (-a + \mathrm{I}\, b)\, s$$

$$AA2 := \left(\frac{2}{5}\, a\, \theta + 5\, \mathrm{I}\, e\right) z^2 + \left(-\frac{2}{5}\, a\, \theta + 5\, \mathrm{I}\, e\right) w + (-c + \mathrm{I}\, d)\, z\, s$$

$$AA3 := (-10\, a - 10\, \mathrm{I}\, b)\, z^3 + (10\, \mathrm{I}\, b + 30\, a)\, z\, w + \left(-\frac{2}{5}\, a\, \theta - 5\, \mathrm{I}\, e\right) s\, w$$

$$AA4 := (-10\, c - 5\, \mathrm{I}\, d)\, w^2 + (10\, a + 10\, \mathrm{I}\, b)\, z\, s\, w + (-20\, c + 10\, \mathrm{I}\, d)\, z^2\, w$$

$$AA5 := \left(-\frac{4}{5}\, a\, \theta - 10\, \mathrm{I}\, e\right) z^5 + (-5\, c + 5\, \mathrm{I}\, d)\, z^4\, s + \left(4\, a\, \theta - 50\, \mathrm{I}\, e\right) z^3\, w + \left(75\, \mathrm{I}\, e - 6\, a\, \theta\right) z\, w^2 + (10\, c - 5\, \mathrm{I}\, d)\, s\, w^2$$

$$AA6 := \left(-20\, a - 20\, \mathrm{I}\, b - \frac{1}{5}\, \mathrm{I}\, \theta\, d + \frac{1}{5}\, \theta\, c\right) z^6 + \left(-\frac{200}{3}\, a + \frac{100}{3}\, \mathrm{I}\, b\right) w^3 + \left(-2\, a\, \theta + 25\, \mathrm{I}\, e\right) z\, s\, w^2 + (200\, a + 100\, \mathrm{I}\, b)\, z^2\, w^2$$

$$AA7 := \left(10\, \mathrm{I}\, d - 10\, c + \frac{2}{7}\, \mathrm{I}\, \theta\, e + \frac{4}{175}\, a\, \theta^2\right) z^7 + (100\, c + 50\, \mathrm{I}\, d)\, z^3\, w^2 + \left(-\frac{200}{3}\, a - \frac{100}{3}\, \mathrm{I}\, b\right) s\, w^3 + \left(-\frac{1}{5}\, \mathrm{I}\, \theta\, d + \frac{1}{5}\, \theta\, c\right) z^6\, s + (50\, a + 50\, \mathrm{I}\, b)\, z^4\, s\, w + (-50\, \mathrm{I}\, d + 70\, c)\, z^5\, w + \left(-100\, c - 50\, \mathrm{I}\, d + 20\, \mathrm{I}\, \theta\, e\right) z\, w^3$$

$$AA8 := A_{0,0,4}\, w^4 + \left(-\frac{3}{175}\, \theta^2\, c + \frac{4}{7}\, \mathrm{I}\, \theta\, b - \frac{31}{7}\, a\, \theta + \frac{3}{175}\, \mathrm{I}\, \theta^2\, d - \frac{125}{2}\, \mathrm{I}\, e\right) z^8 + \left(8\, \overline{A_{0,0,4}} + \frac{1}{2}\, \overline{B_{1,0,3}}\right) z^2\, w^3 + (-30\, \mathrm{I}\, d + 30\, c)\, z^5\, s\, w + \left(-\frac{100}{3}\, c - \frac{50}{3}\, \mathrm{I}\, d\right) z\, s\, w^3 + (-50\, c + 50\, \mathrm{I}\, d)\, z^7\, s + \left(-2\, \mathrm{I}\, \theta\, b + 10\, a\, \theta - 50\, \mathrm{I}\, e\right) z^6\, w \qquad \textbf{(2)}$$

```
> for i from 0 to 7 do
  BB||i :=
  mtaylor(expand(expand(BB)), [z,s,w], i+1, [1,1,2])
  -
  mtaylor(expand(expand(BB)), [z,s,w], i, [1,1,2]);
  od;
```

$$BB0 := c + \mathrm{I}\, d$$

$$BB1 := \left(\frac{4}{5}\, a\, \theta - 10\, \mathrm{I}\, e\right) z + 2\, \mathrm{I}\, d\, s$$

$$BB2 := (-40\, \mathrm{I}\, b - 60\, a)\, z^2 + (-c + \mathrm{I}\, d)\, s^2 + (10\, a - 10\, \mathrm{I}\, b)\, w + \left(\frac{4}{5}\, a\, \theta + 10\, \mathrm{I}\, e\right) z\, s$$

$$BB3 := (-30\, \mathrm{I}\, d + 30\, c)\, z^3 + (40\, c + 20\, \mathrm{I}\, d)\, z\, w + 60\, a\, s\, w + (40\, a - 140\, \mathrm{I}\, b)\, z^2\, s$$

$$BB4 := \left(-14\, a\, \theta + 100\, \mathrm{I}\, e + 6\, \mathrm{I}\, \theta\, b\right) z^4 + \left(2\, a\, \theta + 25\, \mathrm{I}\, e\right) w^2 + (-40\, c + 20\, \mathrm{I}\, d)\, z\, s\, w + \left(24\, a\, \theta - 300\, \mathrm{I}\, e\right) z^2\, w + (10\, a + 10\, \mathrm{I}\, b)\, s^2\, w + (-90\, \mathrm{I}\, d + 90\, c)\, z^3\, s + (-60\, \mathrm{I}\, b + 60\, a)\, z^2\, s^2$$

$$BB5 := \left(-860\, \mathrm{I}\, b + 900\, a + \frac{24}{5}\, \mathrm{I}\, \theta\, d - \frac{24}{5}\, \theta\, c\right) z^5 + (40\, c - 40\, \mathrm{I}\, d)\, z^3\, s^2 + \left(12\, \mathrm{I}\, \theta\, b - 20\, a\, \theta - 100\, \mathrm{I}\, e\right) z^4\, s + (-300\, a - 300\, \mathrm{I}\, b)\, z^3\, w + (400\, a - 200\, \mathrm{I}\, b)\, z\, w^2 + 150\, \mathrm{I}\, e\, s\, w^2 + \left(56\, a\, \theta + 200\, \mathrm{I}\, e\right) z^2\, s\, w$$

$$BB6 := \left(-770\, \mathrm{I}\, d + 690\, c + 4\, \mathrm{I}\, \theta\, e + \frac{32}{25}\, a\, \theta^2 - \frac{24}{25}\, \mathrm{I}\, \theta^2\, b\right) z^6 + \left(-\frac{100}{3}\, c + \frac{50}{3}\, \mathrm{I}\, d\right) w^3 + \left(-250\, c - 350\, \mathrm{I}\, d - 30\, \mathrm{I}\, \theta\, e - \frac{12}{5}\, a\, \theta^2\right) z^4\, w + (400\, a + 200\, \mathrm{I}\, b)\, z\, s\, w^2 + \left(-2\, a\, \theta + 25\, \mathrm{I}\, e\right) s^2\, w^2 + \left(-6\, a\, \theta + 6\, \mathrm{I}\, \theta\, b\right) z^4\, s^2 + \left(600\, c + 300\, \mathrm{I}\, d - 60\, \mathrm{I}\, \theta\, e\right) z^2\, w^2 + (-1500\, a - 300\, \mathrm{I}\, b)\, z^3\, s\, w + \left(300\, \mathrm{I}\, e + 24\, a\, \theta\right) z^2\, s^2\, w + \left(\frac{48}{5}\, \mathrm{I}\, \theta\, d - 1360\, \mathrm{I}\, b + 920\, a - \frac{48}{5}\, \theta\, c\right) z^5\, s$$

$$BB7 := \left(\frac{1056}{7}\, \mathrm{I}\, \theta\, b - 168\, a\, \theta + \frac{144}{175}\, \theta^2\, c - \frac{144}{175}\, \mathrm{I}\, \theta^2\, d\right) z^7 + \left(-48\, \overline{A_{0,0,4}} - 6\, \overline{B_{1,0,3}} + 60\, a\, \theta - 750\, \mathrm{I}\, e\right) z^3\, w^2 - 200\, c\, s\, w^3 + \left(\frac{56}{25}\, a\, \theta^2 - \frac{48}{25}\, \mathrm{I}\, \theta^2\, b + 1460\, c - 1460\, \mathrm{I}\, d + 4\, \mathrm{I}\, \theta\, e\right) z^6\, s + \left(-\frac{24}{5}\, a\, \theta^2 - 60\, \mathrm{I}\, \theta\, e + 100\, c + 100\, \mathrm{I}\, d\right) z^4\, s\, w + \left(\frac{24}{5}\, \mathrm{I}\, \theta\, d - \frac{24}{5}\, \theta\, c + 900\, a - 900\, \mathrm{I}\, b\right) z^5\, s^2 + \left(360\, a\, \theta + 144\, \mathrm{I}\, \theta\, b + 5100\, \mathrm{I}\, e\right) z^5\, w + B_{1,0,3}\, z\, w^3 + (-1000\, a + 200\, \mathrm{I}\, b)\, z^3\, s^2\, w + (-400\, c + 700\, \mathrm{I}\, d)\, z^2\, s\, w^2 \tag{3}$$

```
> for i from 0 to 9 do
  CC||i :=
  mtaylor(expand(expand(CC)), [z,s,w], i+1, [1,1,2])
  -
  mtaylor(expand(expand(CC)), [z,s,w], i, [1,1,2]);
  od;
```

$$CC0 := \mathrm{I}\, e$$

$$CC1 := (2\, a - 2\, \mathrm{I}\, b)\, z$$

$$CC2 := (c - \mathrm{I}\, d)\, z^2 - 2\, c\, w$$

$$CC3 := \left(\frac{4}{5}\, a\, \theta + 10\, \mathrm{I}\, e\right) z\, w$$

$$CC4 := 10\, \mathrm{I}\, w^2\, b + (-10\, a - 10\, \mathrm{I}\, b)\, z^2\, w$$

$$CC5 := (2\, c - 2\, \mathrm{I}\, d)\, z^5 + (-20\, c + 10\, \mathrm{I}\, d)\, z\, w^2$$

$$CC6 := -4\, a\, \theta\, w^3 + (2\, a\, \theta - 25\, \mathrm{I}\, e)\, z^2\, w^2$$

$$CC7 := \left(\frac{2}{35}\, \mathrm{I}\, \theta\, d - \frac{2}{35}\, \theta\, c\right) z^7 + (-20\, a - 20\, \mathrm{I}\, b)\, z^5\, w + \left(\frac{400}{3}\, a + \frac{200}{3}\, \mathrm{I}\, b\right) z\, w^3$$

$$CC8 := (-25\, \mathrm{I}\, d + 10\, \mathrm{I}\, \theta\, e)\, w^4 + \left(-\frac{25}{2}\, \mathrm{I}\, d + \frac{25}{2}\, c\right) z^8 + \left(\frac{100}{3}\, c + \frac{50}{3}\, \mathrm{I}\, d\right) z^2\, w^3 + (10\, \mathrm{I}\, d - 10\, c)\, z^6\, w$$

$$CC9 := \left(-\frac{2}{525}\, \mathrm{I}\, \theta^2\, d + \frac{2}{525}\, \theta^2\, c\right) z^9 + \left(\frac{4}{7}\, \mathrm{I}\, \theta\, b + \frac{4}{7}\, a\, \theta\right) z^7\, w + (4\, a\, \theta - 50\, \mathrm{I}\, e)\, z^5\, w^2 + 2\, \overline{A_{0,\,0,\,4}}\, z\, w^4 \qquad \textbf{(4)}$$