$with(LinearAlgebra)$:

We aim to compute the matrix exponential of the following matrix

$A := Matrix([[a, b, c], [d, e, f], [0, 0, 0]])$

$$\begin{bmatrix} a & b & c \\ d & e & f \\ 0 & 0 & 0 \end{bmatrix} \tag{1}$$

The exponential is straight forward but gives an expression that require complex arithmetic

$B := simplify(MatrixExponential(A, t))$

$$\Bigg[\Bigg[-\Bigg(2\,(a\,e - b\,d)\,\Bigg(\Big(a - e - \sqrt{a^2 - 2\,a\,e + 4\,b\,d + e^2}\Big)\,e^{\frac{1}{2}\left(e + a - \sqrt{a^2 - 2\,a\,e + 4\,b\,d + e^2}\right)t} - e^{\frac{1}{2}\left(e + a + \sqrt{a^2 - 2\,a\,e + 4\,b\,d + e^2}\right)t}\Big(a - e + \sqrt{a^2 - 2\,a\,e + 4\,b\,d + e^2}\Big)\Bigg)\Bigg) \Bigg/ \Bigg(\sqrt{a^2 - 2\,a\,e + 4\,b\,d + e^2}\,\Big(e + a - \sqrt{a^2 - 2\,a\,e + 4\,b\,d + e^2}\Big)\,\Big(e + a + \sqrt{a^2 - 2\,a\,e + 4\,b\,d + e^2}\Big)\Bigg), -\Bigg(4\,b\,\Bigg(e^{\frac{1}{2}\left(e + a - \sqrt{a^2 - 2\,a\,e + 4\,b\,d + e^2}\right)t} - e^{\frac{1}{2}\left(e + a + \sqrt{a^2 - 2\,a\,e + 4\,b\,d + e^2}\right)t}\Bigg)\,(a\,e - b\,d)\Bigg) \Bigg/ \Bigg(\sqrt{a^2 - 2\,a\,e + 4\,b\,d + e^2}\,\Big(e + a - \sqrt{a^2 - 2\,a\,e + 4\,b\,d + e^2}\Big)\,\Big(e + a + \sqrt{a^2 - 2\,a\,e + 4\,b\,d + e^2}\Big)\Bigg), -\Bigg(2\,\Bigg(\Big(\sqrt{a^2 - 2\,a\,e + 4\,b\,d + e^2}\,(b\,f - c\,e) - c\,e^2 + (a\,c + b\,f)\,e + b\,(a\,f - 2\,c\,d)\Big)\,e^{\frac{1}{2}\left(e + a - \sqrt{a^2 - 2\,a\,e + 4\,b\,d + e^2}\right)t} + \Big(\sqrt{a^2 - 2\,a\,e + 4\,b\,d + e^2}\,(b\,f - c\,e) + c\,e^2 + (-a\,c - b\,f)\,e - b\,(a\,f - 2\,c\,d)\Big)\,e^{\frac{1}{2}\left(e + a + \sqrt{a^2 - 2\,a\,e + 4\,b\,d + e^2}\right)t} \tag{2}$$

$$-2\sqrt{a^2-2ae+4bd+e^2}\,(bf-ce)\Big)\Big)\Big/\Big(\sqrt{a^2-2ae+4bd+e^2}\,\Big(e+a$$

$$-\sqrt{a^2-2ae+4bd+e^2}\Big)\Big(e+a+\sqrt{a^2-2ae+4bd+e^2}\Big)\Big)\Big],$$

$$\Big[-\Big(4d\Big(e^{\frac{1}{2}\left(e+a-\sqrt{a^2-2ae+4bd+e^2}\right)t}$$

$$-e^{\frac{1}{2}\left(e+a+\sqrt{a^2-2ae+4bd+e^2}\right)t}\Big)(ae-bd)\Big)\Big/\Big(\sqrt{a^2-2ae+4bd+e^2}\,\Big(e$$

$$+a-\sqrt{a^2-2ae+4bd+e^2}\Big)\Big(e+a+\sqrt{a^2-2ae+4bd+e^2}\Big)\Big),$$

$$\Big(2(ae-bd)\Big(\Big(a-e$$

$$+\sqrt{a^2-2ae+4bd+e^2}\Big)e^{\frac{1}{2}\left(e+a-\sqrt{a^2-2ae+4bd+e^2}\right)t}$$

$$-e^{\frac{1}{2}\left(e+a+\sqrt{a^2-2ae+4bd+e^2}\right)t}\Big(a-e-\sqrt{a^2-2ae+4bd+e^2}\Big)\Big)\Big)\Big/$$

$$\Big(\sqrt{a^2-2ae+4bd+e^2}\,\Big(e+a-\sqrt{a^2-2ae+4bd+e^2}\Big)\Big(e+a$$

$$+\sqrt{a^2-2ae+4bd+e^2}\Big)\Big),\Big(2\Big(\Big(\sqrt{a^2-2ae+4bd+e^2}\,(af-cd)$$

$$+a^2f+(-cd-ef)a+d(2bf-ce)\Big)e^{\frac{1}{2}\left(e+a-\sqrt{a^2-2ae+4bd+e^2}\right)t}$$

$$+\Big(\sqrt{a^2-2ae+4bd+e^2}\,(af-cd)-a^2f+(cd+ef)a+(-2bf$$

$$+ce)d\Big)e^{\frac{1}{2}\left(e+a+\sqrt{a^2-2ae+4bd+e^2}\right)t}-2\sqrt{a^2-2ae+4bd+e^2}\,(af$$

$$-cd)\Big)\Big)\Big/\Big(\sqrt{a^2-2ae+4bd+e^2}\,\Big(e+a-\sqrt{a^2-2ae+4bd+e^2}\Big)\Big(e+a$$

$$+\sqrt{a^2-2ae+4bd+e^2}\Big)\Big)\Big],$$

$$\Big[0,0,1\Big]\Big]$$

Two things are worh noting about this expression:

1. The last row is simply [0, 0, 1], so we will not worry about this aspect of the matrix
2. The expression $\sqrt{a^2-2\,a\,e+4\,b\,d+e^2}$ appears through out the solution. This can get complex valued. We will handle the complex and real settings independently.

We introduce a real variable x which will correspond to the square root in question. Then in the complex case, we work with I*x, and in the real case we work with x

$assume(x, real)$

First we deal with the complex case and replace the square root with I*x

$$M := simplify\left(subs\left(\sqrt{a^2-2\,e\,a+4\,d\,b+e^2}=I\cdot x,\, B[1..2, 1..3]\right)\right)$$

$$\left[\left[-\frac{2\,(a\,e-b\,d)\left((\mathrm{I}\,x\sim-a+e)\,\mathrm{e}^{-\frac{1}{2}(\mathrm{I}\,x\sim-a-e)\,t}+\mathrm{e}^{\frac{1}{2}(e+a+\mathrm{I}\,x\sim)\,t}\,(a-e+\mathrm{I}\,x\sim)\right)}{\sqrt{a^2-2\,a\,e+4\,b\,d+e^2}\,(\mathrm{I}\,x\sim-a-e)\,(e+a+\mathrm{I}\,x\sim)},\right.\right.$$

$$\frac{4\,b\left(\mathrm{e}^{-\frac{1}{2}(\mathrm{I}\,x\sim-a-e)\,t}-\mathrm{e}^{\frac{1}{2}(e+a+\mathrm{I}\,x\sim)\,t}\right)(a\,e-b\,d)}{\sqrt{a^2-2\,a\,e+4\,b\,d+e^2}\,(\mathrm{I}\,x\sim-a-e)\,(e+a+\mathrm{I}\,x\sim)},\ \Big(\big((-4\,c\,d+2\,f\,(e+a$$

$$+\mathrm{I}\,x\sim))\,b-2\,e\,c\,(\mathrm{I}\,x\sim-a+e)\big)\,\mathrm{e}^{-\frac{1}{2}(\mathrm{I}\,x\sim-a-e)\,t}+\big((4\,c\,d+2\,f\,(\mathrm{I}\,x\sim-a-e))\,b$$

$$-2\,(a-e+\mathrm{I}\,x\sim)\,e\,c\big)\,\mathrm{e}^{\frac{1}{2}(e+a+\mathrm{I}\,x\sim)\,t}-4\,\mathrm{I}\,(b\,f-c\,e)\,x\sim\Big)\Big/$$

$$\left.\left(\sqrt{a^2-2\,a\,e+4\,b\,d+e^2}\,(\mathrm{I}\,x\sim-a-e)\,(e+a+\mathrm{I}\,x\sim)\right)\right],$$

$$\left[\frac{4\,d\left(\mathrm{e}^{-\frac{1}{2}(\mathrm{I}\,x\sim-a-e)\,t}-\mathrm{e}^{\frac{1}{2}(e+a+\mathrm{I}\,x\sim)\,t}\right)(a\,e-b\,d)}{\sqrt{a^2-2\,a\,e+4\,b\,d+e^2}\,(\mathrm{I}\,x\sim-a-e)\,(e+a+\mathrm{I}\,x\sim)},\right.$$

$$-\Big(2\,(a\,e-b\,d)\,\Big((a-e+\mathrm{I}\,x\sim)\,\mathrm{e}^{-\frac{1}{2}(\mathrm{I}\,x\sim-a-e)\,t}+(\mathrm{I}\,x\sim-a$$

$$+e)\,\mathrm{e}^{\frac{1}{2}(e+a+\mathrm{I}\,x\sim)\,t}\Big)\Big)\Big/\Big(\sqrt{a^2-2\,a\,e+4\,b\,d+e^2}\,(\mathrm{I}\,x\sim-a-e)\,(e+a$$

$$+\mathrm{I}\,x\sim)\Big),\ \Big(\big(-2\,a^2\,f+(2\,c\,d-2\,f\,(\mathrm{I}\,x\sim-e))\,a+2\,(-2\,b\,f+(\mathrm{I}\,x\sim$$

$$+e)\,c)\,d\big)\,\mathrm{e}^{-\frac{1}{2}(\mathrm{I}\,x\sim-a-e)\,t}+\big(2\,a^2\,f+(-2\,c\,d-2\,(\mathrm{I}\,x\sim+e)\,f)\,a+2\,d\,(2\,b\,f$$

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$$+ (\mathrm{I}\,x\sim - e)\,c)\big)\,\mathrm{e}^{\frac{1}{2}\,(e+a+\mathrm{I}\,x\sim)\,t} + 4\,\mathrm{I}\,x\sim\,(a\,f-c\,d)\Big) \Big/ \left(\sqrt{a^2-2\,a\,e+4\,b\,d+e^2}\,(\mathrm{I}\,x\sim -a-e)\,(e+a+\mathrm{I}\,x\sim)\right)\Big]\Big]$$

We then split the exponentials and apply Euler's theorem, exp(I*x) = cos(x) + I*sin(x)

$$K := simplify\left(subs\left(\mathrm{e}^{-\frac{1}{2}\,\mathrm{I}\,x\cdot t} = \left(\cos\left(-\frac{1}{2}\,x\cdot t\right) + I\cdot\sin\left(-\frac{1}{2}\,x\cdot t\right)\right), subs\left(\mathrm{e}^{\frac{1}{2}\,\mathrm{I}\,x\cdot t} = \left(\cos\left(\frac{1}{2}\,x\cdot t\right) + I\cdot\sin\left(\frac{1}{2}\,x\cdot t\right)\right), \left(subs\left(\mathrm{e}^{\frac{1}{2}\cdot(e+a+\mathrm{I}\,x)\cdot t} = \mathrm{e}^{\frac{a+e}{2}\cdot t}\cdot\mathrm{e}^{\frac{1}{2}\,\mathrm{I}\,x\cdot t}, subs\left(\mathrm{e}^{-\frac{1}{2}\cdot(I\cdot x-a-e)\cdot t} = \mathrm{e}^{\frac{a+e}{2}\cdot t}\cdot\mathrm{e}^{-\frac{1}{2}\,\mathrm{I}\,x\cdot t}, M\right)\right)\right)\right)\right)\right)$$

$$\Bigg[\Bigg[-\frac{2\,(a\,e-b\,d)\left((a-e-x\sim)\,\mathrm{e}^{\frac{1}{2}\,(e+a-x\sim)\,t} - \mathrm{e}^{\frac{1}{2}\,(e+a+x\sim)\,t}\,(a-e+x\sim)\right)}{\sqrt{a^2-2\,a\,e+4\,b\,d+e^2}\,(e+a-x\sim)\,(e+a+x\sim)}, \tag{4}$$

$$-\frac{4\,b\left(\mathrm{e}^{\frac{1}{2}\,(e+a-x\sim)\,t} - \mathrm{e}^{\frac{1}{2}\,(e+a+x\sim)\,t}\right)(a\,e-b\,d)}{\sqrt{a^2-2\,a\,e+4\,b\,d+e^2}\,(e+a-x\sim)\,(e+a+x\sim)}, \Big(\big((4\,c\,d-2\,f\,(e+a+x\sim))\,b-2\,c\,e\,(a-e-x\sim)\big)\,\mathrm{e}^{\frac{1}{2}\,(e+a-x\sim)\,t} + \big((-4\,c\,d+2\,f\,(e+a-x\sim))\,b+2\,c\,e\,(a-e+x\sim)\big)\,\mathrm{e}^{\frac{1}{2}\,(e+a+x\sim)\,t} + 4\,(b\,f-c\,e)\,x\sim\Big) \Big/ \left(\sqrt{a^2-2\,a\,e+4\,b\,d+e^2}\,(e+a-x\sim)\,(e+a+x\sim)\right)\Bigg],$$

$$\Bigg[-\frac{4\,d\left(\mathrm{e}^{\frac{1}{2}\,(e+a-x\sim)\,t} - \mathrm{e}^{\frac{1}{2}\,(e+a+x\sim)\,t}\right)(a\,e-b\,d)}{\sqrt{a^2-2\,a\,e+4\,b\,d+e^2}\,(e+a-x\sim)\,(e+a+x\sim)},$$

$$\frac{2\,(a\,e-b\,d)\left((a-e+x\sim)\,\mathrm{e}^{\frac{1}{2}\,(e+a-x\sim)\,t} - \mathrm{e}^{\frac{1}{2}\,(e+a+x\sim)\,t}\,(a-e-x\sim)\right)}{\sqrt{a^2-2\,a\,e+4\,b\,d+e^2}\,(e+a-x\sim)\,(e+a+x\sim)},$$

$$\left(\left(2\,a^2\,f+(-2\,c\,d-2\,f\,(e-x\sim))\,a+4\,d\left(b\,f-\frac{1}{2}\,c\,(e+x\sim)\right)\right)\mathrm{e}^{\frac{1}{2}\,(e+a-x\sim)\,t} + \left(-2\,a^2\,f+(2\,c\,d+2\,f\,(e+x\sim))\,a-4\left(b\,f-\frac{1}{2}\,c\,(e-x\sim)\right)d\right)\mathrm{e}^{\frac{1}{2}\,(e+a+x\sim)\,t} - 4\,x\sim\,(a\,f-c\,d)\right) \Big/ \left(\sqrt{a^2-2\,a\,e+4\,b\,d+e^2}\,(e+a-x\sim)\,(e+a+x\sim)\right)\Bigg]\Bigg]$$

$$\left(simplify\left(K[1].Vector([u, v, 1])\cdot\sqrt{a^2-2\,a\,e+4\,b\,d+e^2}\,(e+a-x\sim)\,(e+a+x\sim)\right) - 4\cdot(b\cdot f - c\cdot e)\cdot x\right)$$

$$\begin{aligned}&(4\,b^2\,d\,v+((-4\,a\,v-2\,d\,u-2\,f)\,e+(2\,d\,u-2\,f)\,a-2\,x\sim d\,u-2\,f x\sim+4\,c\,d)\,b\\&\quad-2\,e\,(a\,u+c)\,(a-e-x\sim))\,\mathrm{e}^{\frac{1}{2}\,(e+a-x\sim)\,t}+(-4\,b^2\,d\,v+((4\,a\,v+2\,d\,u\\&\quad+2\,f)\,e+(-2\,d\,u+2\,f)\,a-2\,x\sim d\,u-2\,f x\sim-4\,c\,d)\,b+2\,e\,(a\,u+c)\,(a-e\\&\quad+x\sim))\,\mathrm{e}^{\frac{1}{2}\,(e+a+x\sim)\,t}\end{aligned} \quad \textbf{(5)}$$

For some reason Maple has not replaced $\sqrt{a^2-2\,e\,a+4\,d\,b+e^2}$ in the denominator with I*x so we do this manually here

$$L := K\cdot\frac{\sqrt{a^2-2\,e\,a+4\,d\,b+e^2}}{I\cdot x}$$

$$\begin{aligned}&\left[\left[\frac{2\,\mathrm{I}\,(a\,e-b\,d)\left((a-e-x\sim)\,\mathrm{e}^{\frac{1}{2}\,(e+a-x\sim)\,t}-\mathrm{e}^{\frac{1}{2}\,(e+a+x\sim)\,t}\,(a-e+x\sim)\right)}{x\sim\,(e+a-x\sim)\,(e+a+x\sim)},\right.\right.\\&\quad\frac{4\,\mathrm{I}\,b\left(\mathrm{e}^{\frac{1}{2}\,(e+a-x\sim)\,t}-\mathrm{e}^{\frac{1}{2}\,(e+a+x\sim)\,t}\right)(a\,e-b\,d)}{x\sim\,(e+a-x\sim)\,(e+a+x\sim)},\\&\quad-\frac{1}{x\sim\,(e+a-x\sim)\,(e+a+x\sim)}\Big(\mathrm{I}\Big(((4\,c\,d-2\,f\,(e+a+x\sim))\,b-2\,c\,e\,(a-e\\&\quad-x\sim))\,\mathrm{e}^{\frac{1}{2}\,(e+a-x\sim)\,t}+((-4\,c\,d+2\,f\,(e+a-x\sim))\,b+2\,c\,e\,(a-e\\&\quad\left.+x\sim))\,\mathrm{e}^{\frac{1}{2}\,(e+a+x\sim)\,t}+4\,(b\,f-c\,e)\,x\sim\Big)\Big)\right],\\&\quad\left[\frac{4\,\mathrm{I}\,d\left(\mathrm{e}^{\frac{1}{2}\,(e+a-x\sim)\,t}-\mathrm{e}^{\frac{1}{2}\,(e+a+x\sim)\,t}\right)(a\,e-b\,d)}{x\sim\,(e+a-x\sim)\,(e+a+x\sim)},\right.\\&\quad-\frac{2\,\mathrm{I}\,(a\,e-b\,d)\left((a-e+x\sim)\,\mathrm{e}^{\frac{1}{2}\,(e+a-x\sim)\,t}-\mathrm{e}^{\frac{1}{2}\,(e+a+x\sim)\,t}\,(a-e-x\sim)\right)}{x\sim\,(e+a-x\sim)\,(e+a+x\sim)},\\&\quad-\frac{1}{x\sim\,(e+a-x\sim)\,(e+a+x\sim)}\Big(\mathrm{I}\Big(\Big(2\,a^2\,f+(-2\,c\,d-2\,f\,(e-x\sim))\,a+4\,d\,\Big(b\,f\\&\quad-\frac{1}{2}\,c\,(e+x\sim)\Big)\Big)\,\mathrm{e}^{\frac{1}{2}\,(e+a-x\sim)\,t}+\Big(-2\,a^2\,f+(2\,c\,d+2\,f\,(e+x\sim))\,a-4\,\Big(b\,f\end{aligned} \quad \textbf{(6)}$$

$$- \frac{1}{2} c (e - x\sim) \Big) d \Big) e^{\frac{1}{2} (e + a + x\sim) t} - 4 x\sim (a f - c d) \Big) \Big) \Big] \Big]$$

Finally, we get rid of the imaginary numbers in the denominator by expanding it
$E := expand((\mathrm{I} x\sim - a - e) (e + a + \mathrm{I} x\sim))$

$$-a^2 - 2 a e - e^2 - x\sim^2 \tag{7}$$

And we arrive at the final result for the complex case

$result1 := \frac{L \cdot (\mathrm{I} x\sim - a - e) (e + a + \mathrm{I} x\sim)}{E}$

$$\Bigg[\Bigg[\frac{2 \mathrm{I} (a e - b d) \Big((\mathrm{I} x\sim - a + e) e^{-\frac{1}{2} (\mathrm{I} x\sim - a - e) t} + e^{\frac{1}{2} (e + a + \mathrm{I} x\sim) t} (a - e + \mathrm{I} x\sim) \Big)}{(-a^2 - 2 a e - e^2 - x\sim^2) x\sim}, \tag{8}$$
$$- \frac{4 \mathrm{I} b \Big(e^{-\frac{1}{2} (\mathrm{I} x\sim - a - e) t} - e^{\frac{1}{2} (e + a + \mathrm{I} x\sim) t} \Big) (a e - b d)}{(-a^2 - 2 a e - e^2 - x\sim^2) x\sim},$$
$$- \frac{1}{(-a^2 - 2 a e - e^2 - x\sim^2) x\sim} \Big(\mathrm{I} \Big(((-4 c d + 2 f (e + a + \mathrm{I} x\sim)) b - 2 e c (\mathrm{I} x\sim$$
$$- a + e)) e^{-\frac{1}{2} (\mathrm{I} x\sim - a - e) t} + ((4 c d + 2 f (\mathrm{I} x\sim - a - e)) b - 2 (a - e$$
$$+ \mathrm{I} x\sim) e c) e^{\frac{1}{2} (e + a + \mathrm{I} x\sim) t} - 4 \mathrm{I} (b f - c e) x\sim \Big) \Big) \Bigg],$$
$$\Bigg[- \frac{4 \mathrm{I} d \Big(e^{-\frac{1}{2} (\mathrm{I} x\sim - a - e) t} - e^{\frac{1}{2} (e + a + \mathrm{I} x\sim) t} \Big) (a e - b d)}{(-a^2 - 2 a e - e^2 - x\sim^2) x\sim},$$
$$\frac{2 \mathrm{I} (a e - b d) \Big((a - e + \mathrm{I} x\sim) e^{-\frac{1}{2} (\mathrm{I} x\sim - a - e) t} + (\mathrm{I} x\sim - a + e) e^{\frac{1}{2} (e + a + \mathrm{I} x\sim) t} \Big)}{(-a^2 - 2 a e - e^2 - x\sim^2) x\sim},$$
$$- \frac{1}{(-a^2 - 2 a e - e^2 - x\sim^2) x\sim} \Big(\mathrm{I} \Big((-2 a^2 f + (2 c d - 2 f (\mathrm{I} x\sim - e)) a + 2 ($$
$$-2 b f + (\mathrm{I} x\sim + e) c) d) e^{-\frac{1}{2} (\mathrm{I} x\sim - a - e) t} + \big(2 a^2 f + (-2 c d - 2 (\mathrm{I} x\sim + e) f) a$$
$$+ 2 d (2 b f + (\mathrm{I} x\sim - e) c) \big) e^{\frac{1}{2} (e + a + \mathrm{I} x\sim) t} + 4 \mathrm{I} x\sim (a f - c d) \Big) \Big) \Bigg] \Bigg]$$

We now proceed to the real (non-complex case). That is we replace
$\sqrt{a^2 - 2 a e + 4 b d + e^2}$ with x:

$$M := simplify\left(subs\left(\sqrt{a^2 - 2\,e\,a + 4\,d\,b + e^2} = x, B[1..2, 1..3]\right)\right)$$

$$\left[\left[-\frac{2\,(a\,e - b\,d)\left((a - e - x\sim)\,e^{\frac{1}{2}(e + a - x\sim)\,t} - e^{\frac{1}{2}(e + a + x\sim)\,t}\,(a - e + x\sim)\right)}{\sqrt{a^2 - 2\,a\,e + 4\,b\,d + e^2}\,(e + a - x\sim)\,(e + a + x\sim)}, -\frac{4\,b\left(e^{\frac{1}{2}(e + a - x\sim)\,t} - e^{\frac{1}{2}(e + a + x\sim)\,t}\right)(a\,e - b\,d)}{\sqrt{a^2 - 2\,a\,e + 4\,b\,d + e^2}\,(e + a - x\sim)\,(e + a + x\sim)}, \left(((4\,c\,d - 2\,f\,(e + a + x\sim))\,b - 2\,c\,e\,(a - e - x\sim))\,e^{\frac{1}{2}(e + a - x\sim)\,t} + ((-4\,c\,d + 2\,f\,(e + a - x\sim))\,b + 2\,c\,e\,(a - e + x\sim))\,e^{\frac{1}{2}(e + a + x\sim)\,t} + 4\,(b\,f - c\,e)\,x\sim\right) \Big/ \left(\sqrt{a^2 - 2\,a\,e + 4\,b\,d + e^2}\,(e + a - x\sim)\,(e + a + x\sim)\right)\right], \left[-\frac{4\,d\left(e^{\frac{1}{2}(e + a - x\sim)\,t} - e^{\frac{1}{2}(e + a + x\sim)\,t}\right)(a\,e - b\,d)}{\sqrt{a^2 - 2\,a\,e + 4\,b\,d + e^2}\,(e + a - x\sim)\,(e + a + x\sim)}, \frac{2\,(a\,e - b\,d)\left((a - e + x\sim)\,e^{\frac{1}{2}(e + a - x\sim)\,t} - e^{\frac{1}{2}(e + a + x\sim)\,t}\,(a - e - x\sim)\right)}{\sqrt{a^2 - 2\,a\,e + 4\,b\,d + e^2}\,(e + a - x\sim)\,(e + a + x\sim)}, \left(\left(2\,a^2\,f + (-2\,c\,d - 2\,f\,(e - x\sim))\,a + 4\,d\left(b\,f - \frac{1}{2}\,c\,(e + x\sim)\right)\right)e^{\frac{1}{2}(e + a - x\sim)\,t} + \left(-2\,a^2\,f + (2\,c\,d + 2\,f\,(e + x\sim))\,a - 4\left(b\,f - \frac{1}{2}\,c\,(e - x\sim)\right)d\right)e^{\frac{1}{2}(e + a + x\sim)\,t} - 4\,x\sim\,(a\,f - c\,d)\right) \Big/ \left(\sqrt{a^2 - 2\,a\,e + 4\,b\,d + e^2}\,(e + a - x\sim)\,(e + a + x\sim)\right)\right]\right] \tag{9}$$

Again, Maple does not make the substitution of the square root in the denominator, so we do it manually

$$result2 := \frac{M \cdot \sqrt{a^2 - 2\,a\,e + 4\,b\,d + e^2}}{x}$$

$$\left[\left[-\frac{2\,(a\,e - b\,d)\left((a - e - x\sim)\,e^{\frac{1}{2}(e + a - x\sim)\,t} - e^{\frac{1}{2}(e + a + x\sim)\,t}\,(a - e + x\sim)\right)}{x\sim\,(e + a - x\sim)\,(e + a + x\sim)}, -\frac{4\,b\left(e^{\frac{1}{2}(e + a - x\sim)\,t} - e^{\frac{1}{2}(e + a + x\sim)\,t}\right)(a\,e - b\,d)}{x\sim\,(e + a - x\sim)\,(e + a + x\sim)}, \right. \tag{10}$$

$$\frac{1}{x\sim(e+a-x\sim)(e+a+x\sim)}\Big(((4cd-2f(e+a+x\sim))b-2ce(a-e-x\sim))e^{\frac{1}{2}(e+a-x\sim)t}+((-4cd+2f(e+a-x\sim))b+2ce(a-e+x\sim))e^{\frac{1}{2}(e+a+x\sim)t}+4(bf-ce)x\sim\Big)\Big],$$

$$\Big[-\frac{4d\left(e^{\frac{1}{2}(e+a-x\sim)t}-e^{\frac{1}{2}(e+a+x\sim)t}\right)(ae-bd)}{x\sim(e+a-x\sim)(e+a+x\sim)},$$

$$\frac{2(ae-bd)\left((a-e+x\sim)e^{\frac{1}{2}(e+a-x\sim)t}-e^{\frac{1}{2}(e+a+x\sim)t}(a-e-x\sim)\right)}{x\sim(e+a-x\sim)(e+a+x\sim)},$$

$$\frac{1}{x\sim(e+a-x\sim)(e+a+x\sim)}\Bigg(\Big(2a^2f+(-2cd-2f(e-x\sim))a+4d\Big(bf-\frac{1}{2}c(e+x\sim)\Big)\Big)e^{\frac{1}{2}(e+a-x\sim)t}+\Big(-2a^2f+(2cd+2f(e+x\sim))a-4\Big(bf-\frac{1}{2}c(e-x\sim)\Big)d\Big)e^{\frac{1}{2}(e+a+x\sim)t}-4x\sim(af-cd)\Bigg)\Big]\Big]$$

Then this is a perfectly fine solution for the real case.

The resulting code should then compute

$y := a^2 - 2ae + 4bd + e^2$

$$a^2-2ae+4bd+e^2 \tag{11}$$

if y < 0, then apply the complex solution. If y > 0, apply the real solution, and if y = 0, then I guess we can consider the limit x->0:

$simplify(limit(result2[1, 1], x = 0))$

$$\frac{2e^{\frac{1}{2}(e+a)t}(at-et+2)(ae-bd)}{(e+a)^2} \tag{12}$$

$$\frac{1}{a^2+2ae+e^2}\left(2e^{\frac{1}{2}e}e^{\frac{1}{2}a}a^2e-2e^{\frac{1}{2}e}e^{\frac{1}{2}a}abd-2e^{\frac{1}{2}e}e^{\frac{1}{2}a}ae^2+2e^{\frac{1}{2}e}e^{\frac{1}{2}a}bde+4e^{\frac{1}{2}e}e^{\frac{1}{2}a}ea-4e^{\frac{1}{2}e}e^{\frac{1}{2}a}db\right) \tag{13}$$

$simplify(limit(result2[1, 2], x = 0))$

$$\frac{4tb(ae-bd)e^{\frac{1}{2}(e+a)t}}{(e+a)^2} \tag{14}$$

$simplify(limit(result2[1, 3], x = 0))$

$$\frac{\left(-2 c e^{2} + (2 b f + 2 c (a + 2)) e + 2 (-2 c d + f (a - 2)) b\right) e^{\frac{1}{2} e + \frac{1}{2} a} + 4 b f - 4 c e}{(e + a)^{2}} \tag{15}$$

$simplify(limit(result2[2, 1], x = 0))$

$$\frac{4 t d (a e - b d) e^{\frac{1}{2} (e + a) t}}{(e + a)^{2}} \tag{16}$$

$simplify(limit(result2[2, 2], x = 0))$

$$-\frac{2 e^{\frac{1}{2} (e + a) t} (a t - e t - 2) (a e - b d)}{(e + a)^{2}} \tag{17}$$

$simplify(limit(result2[2, 3], x = 0))$

$$\frac{1}{(e + a)^{2}} \left(\left(-2 t a^{2} f + (2 c d t + 2 e f t + 4 f) a - 4 d \left(b f t - \frac{1}{2} c e t + c \right) \right) e^{\frac{1}{2} (e + a) t} - 4 a f + 4 c d \right) \tag{18}$$