Target equation:

$$-ia_1u^{(1,0)}(x,t)+a_{10}u^{(10,0)}(x,t)-ia_{11}u^{(11,0)}(x,t)+a_{12}u^{(12,0)}(x,t)-ia_{13}u^{(13,0)}(x,t)+a_{14}u^{(14,0)}(x,t)-$$
$$ia_{15}u^{(15,0)}(x,t)+a_{16}u^{(16,0)}(x,t)-ia_{17}u^{(17,0)}(x,t)+a_{18}u^{(18,0)}(x,t)+a_2u^{(2,0)}(x,t)-ia_3u^{(3,0)}(x,t)+$$
$$a_4u^{(4,0)}(x,t)-ia_5u^{(5,0)}(x,t)+a_6u^{(6,0)}(x,t)-ia_7u^{(7,0)}(x,t)+a_8u^{(8,0)}(x,t)-ia_9u^{(9,0)}(x,t)-bu(x,t)\left|u(x,t)\right|^2+$$
$$iu^{(0,1)}(x,t)=0$$

Substitutions:

$$\mathrm{N}=9$$
$$u(x,t)\to y(z)e^{i(kx-\omega t)}$$
$$z\to x-\mathrm{C0}t$$
$$y(z)\to AR(z)^9$$
$$R'(z)^2=R(z)^2\left(1-\chi R(z)^2\right)$$

Imaginary part of equation after substitutions:

$$y'(z)\left(a_1+k\left(k\left(k\left(k\left(k\left(k\left(k\left(-10a_{10}k-11a_{11}k^2+12a_{12}k^3+13a_{13}k^4-14a_{14}k^5-15a_{15}k^6+16a_{16}k^7+1\right.\right.\right.\right.\right.\right.\right.$$
$$y^{(3)}(z)\left(k\left(k\left(k\left(k\left(k\left(k\left(120a_{10}k+165a_{11}k^2-220a_{12}k^3-286a_{13}k^4+364a_{14}k^5+455a_{15}k^6-560a_{16}k^7-680\right.\right.\right.\right.\right.\right.$$
$$252a_{10}k^5y^{(5)}(z)+120a_{10}k^3y^{(7)}(z)-10a_{10}ky^{(9)}(z)-462a_{11}k^6y^{(5)}(z)+330a_{11}k^4y^{(7)}(z)-55a_{11}k^2y^{(9)}(z)+$$
$$a_{11}y^{(11)}(z)+792a_{12}k^7y^{(5)}(z)-792a_{12}k^5y^{(7)}(z)+220a_{12}k^3y^{(9)}(z)-12a_{12}ky^{(11)}(z)+1287a_{13}k^8y^{(5)}(z)-$$
$$1716a_{13}k^6y^{(7)}(z)+715a_{13}k^4y^{(9)}(z)-78a_{13}k^2y^{(11)}(z)+a_{13}y^{(13)}(z)-2002a_{14}k^9y^{(5)}(z)+3432a_{14}k^7y^{(7)}(z)-$$
$$2002a_{14}k^5y^{(9)}(z)+364a_{14}k^3y^{(11)}(z)-14a_{14}ky^{(13)}(z)-3003a_{15}k^{10}y^{(5)}(z)+6435a_{15}k^8y^{(7)}(z)-$$
$$5005a_{15}k^6y^{(9)}(z)+1365a_{15}k^4y^{(11)}(z)-105a_{15}k^2y^{(13)}(z)+a_{15}y^{(15)}(z)+4368a_{16}k^{11}y^{(5)}(z)-11440a_{16}k^9y^{(7)}(z)+$$
$$11440a_{16}k^7y^{(9)}(z)-4368a_{16}k^5y^{(11)}(z)+560a_{16}k^3y^{(13)}(z)-16a_{16}ky^{(15)}(z)+6188a_{17}k^{12}y^{(5)}(z)-$$
$$19448a_{17}k^{10}y^{(7)}(z)+24310a_{17}k^8y^{(9)}(z)-12376a_{17}k^6y^{(11)}(z)+2380a_{17}k^4y^{(13)}(z)-136a_{17}k^2y^{(15)}(z)+$$
$$a_{17}y^{(17)}(z)-8568a_{18}k^{13}y^{(5)}(z)+31824a_{18}k^{11}y^{(7)}(z)-48620a_{18}k^9y^{(9)}(z)+31824a_{18}k^7y^{(11)}(z)-$$
$$8568a_{18}k^5y^{(13)}(z)+816a_{18}k^3y^{(15)}(z)-18a_{18}ky^{(17)}(z)+a_5y^{(5)}(z)-6a_6ky^{(5)}(z)-21a_7k^2y^{(5)}(z)+$$
$$a_7y^{(7)}(z)+56a_8k^3y^{(5)}(z)-8a_8ky^{(7)}(z)+126a_9k^4y^{(5)}(z)-36a_9k^2y^{(7)}(z)+a_9y^{(9)}(z)=0$$

Real part of equation after substitutions:

$$-3060a_{18}y^{(4)}(z)k^{14}+2380a_{17}y^{(4)}(z)k^{13}+1820a_{16}y^{(4)}(z)k^{12}+18564a_{18}y^{(6)}(z)k^{12}-1365a_{15}y^{(4)}(z)k^{11}-$$
$$12376a_{17}y^{(6)}(z)k^{11}-1001a_{14}y^{(4)}(z)k^{10}-8008a_{16}y^{(6)}(z)k^{10}-43758a_{18}y^{(8)}(z)k^{10}+715a_{13}y^{(4)}(z)k^9+$$
$$5005a_{15}y^{(6)}(z)k^9+24310a_{17}y^{(8)}(z)k^9+495a_{12}y^{(4)}(z)k^8+3003a_{14}y^{(6)}(z)k^8+12870a_{16}y^{(8)}(z)k^8+$$
$$43758a_{18}y^{(10)}(z)k^8-330a_{11}y^{(4)}(z)k^7-1716a_{13}y^{(6)}(z)k^7-6435a_{15}y^{(8)}(z)k^7-19448a_{17}y^{(10)}(z)k^7-$$
$$210a_{10}y^{(4)}(z)k^6-924a_{12}y^{(6)}(z)k^6-3003a_{14}y^{(8)}(z)k^6-8008a_{16}y^{(10)}(z)k^6-18564a_{18}y^{(12)}(z)k^6+$$
$$126a_9y^{(4)}(z)k^5+462a_{11}y^{(6)}(z)k^5+1287a_{13}y^{(8)}(z)k^5+3003a_{15}y^{(10)}(z)k^5+6188a_{17}y^{(12)}(z)k^5+$$
$$70a_8y^{(4)}(z)k^4+210a_{10}y^{(6)}(z)k^4+495a_{12}y^{(8)}(z)k^4+1001a_{14}y^{(10)}(z)k^4+1820a_{16}y^{(12)}(z)k^4+3060a_{18}y^{(14)}(z)k^4-$$
$$35a_7y^{(4)}(z)k^3-84a_9y^{(6)}(z)k^3-165a_{11}y^{(8)}(z)k^3-286a_{13}y^{(10)}(z)k^3-455a_{15}y^{(12)}(z)k^3-680a_{17}y^{(14)}(z)k^3-$$
$$15a_6y^{(4)}(z)k^2-28a_8y^{(6)}(z)k^2-45a_{10}y^{(8)}(z)k^2-66a_{12}y^{(10)}(z)k^2-91a_{14}y^{(12)}(z)k^2-120a_{16}y^{(14)}(z)k^2-$$

$153a_{18}y^{(16)}(z)k^2 + 5a_5y^{(4)}(z)k + 7a_7y^{(6)}(z)k + 9a_9y^{(8)}(z)k + 11a_{11}y^{(10)}(z)k + 13a_{13}y^{(12)}(z)k +$

$15a_{15}y^{(14)}(z)k+17a_{17}y^{(16)}(z)k-by(z)^3+(-a_{18}k^{18} + a_{17}k^{17} + a_{16}k^{16} - a_{15}k^{15} - a_{14}k^{14} + a_{13}k^{13} + a_{12}k^{12} - a_1$

$(a_2 + k\,(3a_3 + k\,(k\,(15a_6 + k\,(21a_7 + k\,(k\,(153a_{18}k^9 - 136a_{17}k^8 - 120a_{16}k^7 + 105a_{15}k^6 + 91a_{14}k^5 - 78a_{13}$

$a_4y^{(4)}(z)+a_6y^{(6)}(z)+a_8y^{(8)}(z)+a_{10}y^{(10)}(z)+a_{12}y^{(12)}(z)+a_{14}y^{(14)}(z)+a_{16}y^{(16)}(z)+a_{18}y^{(18)}(z) = 0$

Constraints on coefficients from imaginary part of equation:

$a_{17} \to 18a_{18}k$

$a_{15} \to 16\,(a_{16}k + 102a_{18}k^3)$

$a_{13} \to 14\,(a_{14}k + 80a_{16}k^3 + 9792a_{18}k^5)$

$a_{11} \to 4\,(3a_{12}k + 182a_{14}k^3 + 17472a_{16}k^5 + 2164032a_{18}k^7)$

$a_9 \to 2\,(5a_{10}k + 220a_{12}k^3 + 16016a_{14}k^5 + 1555840a_{16}k^7 + 192924160a_{18}k^9)$

$a_7 \to 8\,(30a_{10}k^3 + 1584a_{12}k^5 + 116688a_{14}k^7 + 11348480a_{16}k^9 + 1407384576a_{18}k^{11} + a_8k)$

$a_5 \to 2\,(2016a_{10}k^5 + 107712a_{12}k^7 + 7943936a_{14}k^9 + 772681728a_{16}k^{11} + 95825608704a_{18}k^{13} + 3a_6k + 56a_8k^3$

$a_3 \to 4k\,(8160a_{10}k^6 + 436480a_{12}k^8 + 32195072a_{14}k^{10} + 3131555840a_{16}k^{12} + 388366491648a_{18}k^{14} + a_4 + 10a$

$\mathrm{C0} \to a_1-79360a_{10}k^9-4245504a_{12}k^{11}-313155584a_{14}k^{13}-30460116992a_{16}k^{15}-3777576173568a_{18}k^{17}-$

$2a_2k - 8a_4k^3 - 96a_6k^5 - 2176a_8k^7$

Constraints on coefficients from real part of equation:

$b \to -\frac{10002268381116211200000a_{18}\chi^9}{A^2}$

$a_{16} \to -3a_{18}\,(51k^2 + 947)$

$a_{14} \to 12\,(255a_{18}k^4 + 28410a_{18}k^2 + 287171a_{18})$

$a_{12} \to -52\,(357a_{18}k^6 + 99435a_{18}k^4 + 6030591a_{18}k^2 + 44922041a_{18})$

$a_{10} \to 858\,(51a_{18}k^8 + 26516a_{18}k^6 + 4020394a_{18}k^4 + 179688164a_{18}k^2 + 1133241371a_{18})$

$a_8 \to -78\,(561a_{18}k^{10} + 468765a_{18}k^8 + 132673002a_{18}k^6 + 14824273530a_{18}k^4 + 560954478645a_{18}k^2 + 329368$

$a_6 \to 4\,(4641a_{18}k^{12} + 5687682a_{18}k^{10} + 2587123539a_{18}k^8 + 539603556492a_{18}k^6 + 51046857556695a_{18}k^4 + 17$

$a_4 \to -12\,(255a_{18}k^{14} + 430885a_{18}k^{12} + 287458171a_{18}k^{10} + 96357777945a_{18}k^8 + 17015619185565a_{18}k^6 + 149$

$a_2 \to 3\,(51a_{18}k^{16} + 113640a_{18}k^{14} + 104530244a_{18}k^{12} + 51390814904a_{18}k^{10} + 14584816444770a_{18}k^8 + 23978$

$\omega \to -a_1k+17a_{18}k^{18}+42615a_{18}k^{16}+44798676a_{18}k^{14}+25695407452a_{18}k^{12}+8750889866862a_{18}k^{10}+$

$1798352775339666a_{18}k^8+21471184303429802 0a_{18}k^6+1308857415743834 4492a_{18}k^4+2435470653715031900 2$

$5669162887825953140625a_{18}$

y(z) - function:

$$\frac{262144a^9A}{\left(4a^2e^z + \chi e^{-z}\right)^9}$$

u(x, t) - function:

$$\frac{262144a^9Ae^{i(kx-\omega t)}}{\left(4a^2e^{\mathrm{C0}t+x} + \chi e^{-\mathrm{C0}t-x}\right)^9}$$