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Rational solutions of order N to the KPI equation with multi-parameters and the explicit case of order 3

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Abstract

We present multiparametric rational solutions to the Kadomtsev-Petviashvili equation (KPI). These solutions of order N depend on $2N-2$ real parameters.
Explicit expressions of the solutions at order 3 are given. They can be expressed as a quotient of a polynomial of degree $2N(N+1)-2$ in x, y and t by a polynomial of degree $2N(N+1)$ in x, y and t, depending on $2N-2$ real parameters. We study the patterns of their modulus in the (x,y) plane for different values of time t and parameters.

PACS numbers :
33Q55, 37K10, 47.10A-, 47.35.Fg, 47.54.Bd

1 Introduction

The Kadomtsev-Petviashvili equation (KPI) is a well-known nonlinear partial differential equation in two spatial and one temporal coordinates which can be written in the following form :

$$(4u_t - 6uu_x + u_{xxx})_x = 3u_{yy}, \tag{1}$$

with subscripts x, y and t denoting partial derivatives.
The KP equation first appeared in 1970, in a paper written by Kadomtsev and Petviashvili [65]. The discovery of the KP equation happened almost simultaneously with the development of the inverse scattering transform (IST) as it is

explained in Manakov et al. [68]. In 1974 Dryuma showed how the KP equation could be written in Lax form [5], and Zakharov extended the IST to equations in two spatial dimensions, including the KP equation, and obtained several exact solutions to the KP equation.
In 1981 Dubrovin constructed for the first time [7] the solutions to KPI given in terms of Riemann theta functions in the frame of algebraic geometry .
From the 1980's, a lot of methods have been found to solve that equation. We can quote the nonlocal Riemann-Hilbert problem, the d-bar problem or inverse scattering problem using integration in the complex plane. More details can be found in the book by Ablowitz and Clarkson published in 1991 [1].
We can cite in particular the works of Krichever [67], Satsuma and Ablowitz in 1979 [73], Matveev in 1979 [69], Freeman and Nimmo in 1983 [8, 9], Pelinovsky and Stepanyants in 1993 [71], Pelinovsky in 1994 [72], Ablowitz and Villarroel [2, 75] in 1997-1999, Biondini and Kodama [3, 66, 4] in 2003-2007.

This paper is part of a program of research of rational solutions of partial differential equations. New solutions of the KPI equation are presented here. We express rational solutions in terms of a quotient of a polynomial of degree $2N(N+1)-2$ in x, y and t by a polynomial of degree $2N(N+1)$ in x, y and t depending on $2N-2$ real parameters. This representation allows to obtain an infinite hierarchy of solutions to the KPI equation, depending on $2N-2$ real parameters .
That provides an effective method to construct an infinite hierarchy of rational solutions of order N depending on $2N-2$ real parameters. We present here only the rational solutions of order 3, depending on 4 real parameters, and the representations of their modulus in the plane of the coordinates (x, y) according to real parameters a_1, b_1, a_2, b_2 and time t.

2 Rational solutions of order N to the KPI equation depending on $2N-2$ real parameters

We consider the matrix M defined by :

$$m_{ij} = \sum_{k=0}^{i} c_{i-k} \left(\frac{\sqrt{p^2-4}}{3} \partial_p \right)^k \sum_{l=0}^{j} c_{j-l} \left(\frac{\sqrt{q^2-4}}{3} \partial_q \right)^l$$
$$\times \left(\frac{1}{p+q} \exp\left(\frac{1}{2}(p+q)(-x+\frac{3}{4}t) - \frac{1}{4}(p^2-q^2)iy) \right) \right)_{p=q=-1}. \quad (2)$$

The coefficients c_j are defined by :

$$c_{2j} = 0, \quad c_{2j+1} = a_j + ib_j \quad 1 \le j \le N-1, \quad (3)$$

where a_j and b_j are arbitrary real numbers.
Then we have the following result :

Theorem 2.1 *The function v defined by*

$$v(x,y,t) = -2\,\partial_x^2\,(\ln\det(m_{2i-1,2j-1})_{1\le i,j\le N}) \tag{4}$$

is a solution to the KPI equation (1), depending on $2N-2$ parameters a_k, b_k, $1 \le k \le N-1$.

3 Rational solutions of order 3 depending on 4 parameters

In the following, we explicitly construct rational solutions to the KPI equation of order 3 depending on 4 parameters.
Because of the length of the expression of the solution, we only give the expression without parameters and we present it in the appendix.

We give patterns of the modulus of the solutions in the plane (x, y) of coordinates in functions of parameters a_1, b_1, a_2, b_2 and time t.
In all the following figures, if the parameters are not quoted then there are equal to 0.

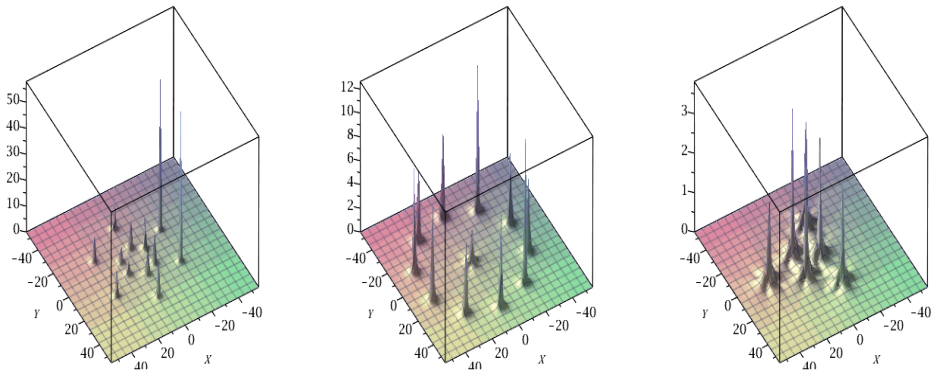


Figure 1. Solution of order 3 to KPI, on the left for $t = 0$, $a_1 = 10^4$; in the center for $t = 0$, $a_2 = 10^8$; on the right for $t = 0$, $b_1 = 10^4$.

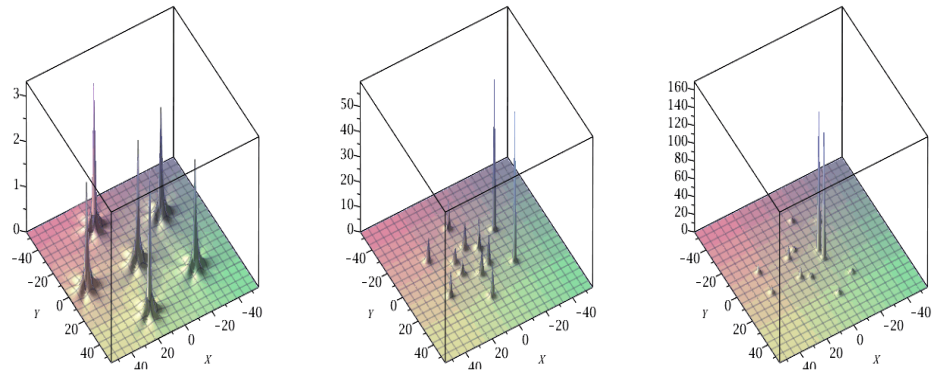


Figure 2. Solution of order 3 to KPI, on the left for $t = 0$, $b_2 = 10^8$; in the center for $t = 0$, $a_1 = 10^4$, $\quad a_2 = 10^4$; on the right for $t = 0$, $a_1 = 10^4$, $\quad a_2 = 10^4$, $\quad b_1 = 10^4$, $\quad b_2 = 10^8$.

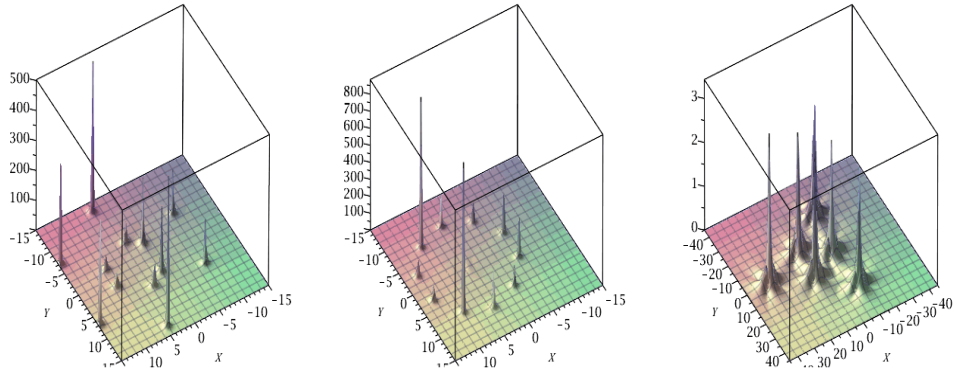


Figure 3. Solution of order 3 to KPI, on the left for $a_1 = 10^3$; in the center for $a_2 = 10^5$; on the right for $b_1 = 10^4$; here $t = 1$.

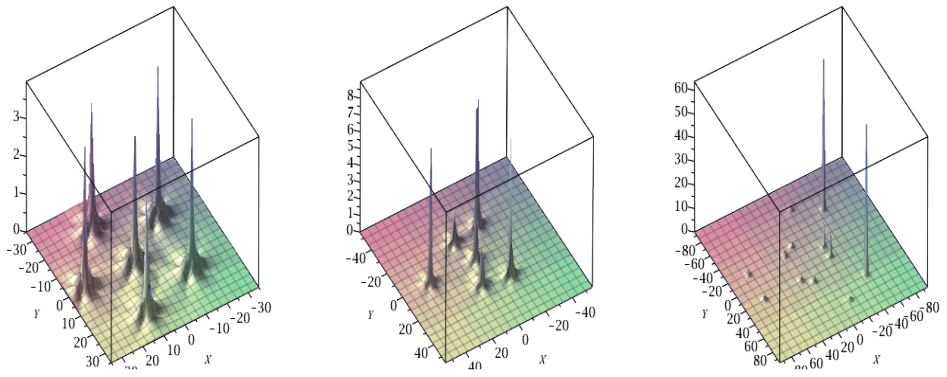


Figure 4. Solution of order 3 to KPI, on the left for $t = 1$, $b_2 = 10^7$; in the

center for $t = 1$, $a_1 = 10^3$, $a_2 = 10^5$, $b_1 = 10^4$, $b_2 = 10^7$; on the right for $t = 1$, $a_1 = 10^5$, $a_2 = 10^5$, $b_1 = 10^5$, $b_2 = 10^5$.

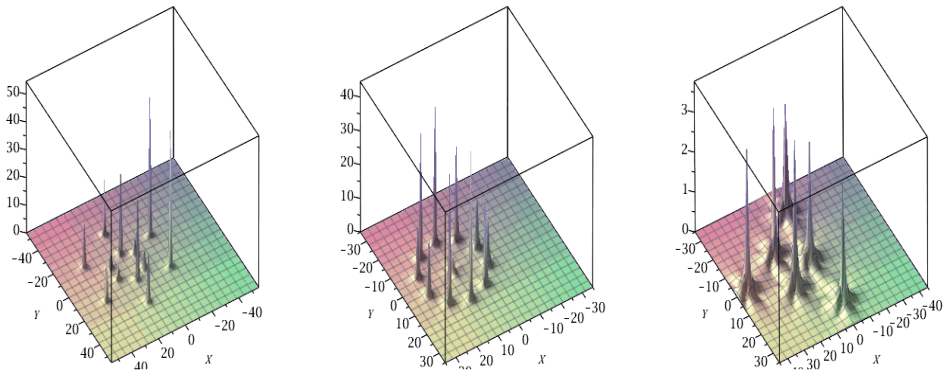


Figure 5. Solution of order 3 to KPI, on the left for $t = 10$, $a_1 = 10^4$; in the center for $t = 10$, $a_2 = 10^4$; on the right for $t = 10$, $b_1 = 10^4$.

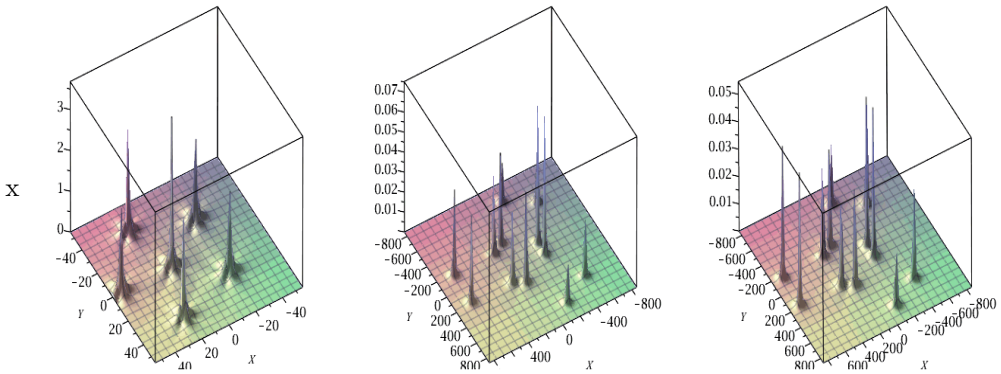


Figure 6. Solution of order 3 to KPI, on the left for $t = 10$, $b_1 = 10^8$; in the center for $t = 10$, $a_1 = 10^8$, $a_2 = 10^8$, $b_1 = 10^8$, $b_2 = 10^8$; on the right for $t = 10^2$, $a_1 = 10^8$, $a_2 = 10^8$, $b_1 = 10^8$, $b_2 = 10^8$.

The previous study shows the appearance of different types of configurations.
If $a_1 \neq 0$ and the other parameters equal to 0, we get 12 peaks on two concentric rings, 6 on the first and 6 on the second one.
For $a_2 \neq 0$ and the other parameters equal to 0, we get 10 peaks on a ring and a peak in the center of the ring.
If $b_1 \neq 0$ and the other parameters equal to 0, we get 6 peaks on a triangle.
For $b_2 \neq 0$ and the other parameters equal to 0, we get 5 peaks on a ring and one peak in the center of the ring.
In the case where two parameters a_1 and a_2 are not equal to 0, the other parameters being equal to 0, for the same values of parameters, we get 12 peaks on two concentric rings, which shows the predominance of the parameter a_1 over

the parameter a_2 on the structure of the solutions.
In the case where two parameters b_1 and b_2 are not equal to 0, the other parameters being equal to 0, for the same values of parameters, we get 6 peaks on a ring with a peak in the center of the ring, which shows also the predominance of the parameter b_1 over the parameter b_2 on the structure of the solutions.
In the case where all parameters a_1, a_2, b_1, b_2, are not equal to 0, for the same values of parameters, we get 6 couples of 2 peaks on two rings.

4 Conclusion

In this article, rational solutions to the KPI equation have been built in terms of quotients of a polynomial of degree $2N(N+1)-2$ in x, y and t by a polynomial of degree $2N(N+1)$ in x, y and t, depending on $2N-2$ parameters.
Other approaches to build solutions of KPI equation had been realized, and we can mention those most significant. In 1990, Hirota and Ohta [62] built, the solutions as particular case of a hierarchy of coupled bilinear equations given in terms of Pfaffians. In 1993, the Darboux transformations was used to obtain among others the solutions of the multicomponent KP hierarchy [70], but no explicit solutions were given. More recently, in 2013, wronskians identities of bilinear KP hierarchy were given [64]. In 2014, solutions of KPI equation were constructed [76]; an explicit solution at order 1 was built and only one asymptotic study has been carried out for order higher than 2.
In 2016, three types of representations of the solutions were given in [42], in terms of Fredholm determinants, wronskians and degenerate determinants.
The structures of the solutions given in this paper looks like to these given in [42] which were deduced from the solutions to the NLS equation [15, 32, 39].
But, to the best of my knowledge, some of the structures of these solutions had never been presented. It will be relevant to find explicit solutions for higher orders and try to describe the structure of these rational solutions.

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Appendix The general solution depending on 4 parameter being too large, we present only the solution without parameters. In can be written as :

$$v(x,y,t) = -2\frac{n_3(x,y,t)}{(d_3(x,y,t))^2}$$

with

$$n_3(x,y,t) = -3377699720527872\,x^{22}+(55732045388709888\,t+27246777745591 5008)x^{21}+(-4291367494930661376\,t-438889857436090368\,t^2-30399297484750848\,y^2-10655516718358593536)x^{20}+(2194449287180451840\,t^3+455989462271262720\,ty^2+3218525621197996032 0\,t^2+2683469837968710041 60+22292818155483955 20\,y^2+159832750775378903040\,t)x^{19}+(-11821949021847552 0\,y^4-79015655462215352320\,y^2-152879967006904811520\,t^3-382394451910541180928 0\,t-3176726587156463616 0\,ty^2-113880834927457468416 0\,t^2-4877083144468331233280-781772558558035968 0\,t^4-3248924918682746880\,t^2y^2)x^{18}+(25811625503961529712640\,t^2+17963733013674065920 00\,y^2+214429044633061294080\,t^2y^2+14620162134072360960\,t^3y^2+51246375717355860787 20\,t^3+1595963117949419520\,ty^4+679589918660478002790 40+21107859081066971136\,t^5+51596988864830373888 0\,t^4+7802486354419384320\,y^4+658406224503224716492 80\,t+10667113487399072563 20\,ty^2)x^{17}+(-10969940839183650127 8720\,t^3-419733968120805756764160\,t^2-86647714629210945355776 0\,t-448542005472673136 64\,t^6-25332747903959040 0\,y^6-163347822599071806259 20\,t^4-99481701018847150080\,ty^4-75304092642311437025 2800-29326224801537279918080\,y^2-229037595924344340480 00\,ty^2-10174264876927549440\,t^2y^4-91132343969051049984 0\,t^3y^2-46601766802355650560\,t^4y^2-131572321605317453414 4\,t^5-6800284848216908759040\,t^2y^2-24794567748488265728 0\,y^4)x^{16}+(6793167708394783548375040+272011393928676350361 60\,t^3y^2+768929152238868234 24\,t^7+5968902061130829004 80\,t^2y^4+2975348129818591887360\,ty^4+406970595077101977 60\,t^3y^4+3519146976184473590169 60\,ty^2+5027548408018779504640\,y^4+1118442403256535613 44\,t^5y^2+519886287775265672134656 0\,t^2+32909822517550950383616 0\,t^4+364818141054811661926400\,y^2+392034774237723350220 8\,t^5+30399297484750848 00\,ty^6+167893587248322302705664 0\,t^3+1486187877032263680 0\,y^6+263144643210634906828 8\,t^6+27339703190715314995 20\,t^4y^2+90364911170773724430336 00\,t+13742255755460660428800 0\,t^2y^2)x^{15}+(-50830262533560219992064000\,t^2-11446047986543493120 0\,t^4y^4-22383382729240608768 00\,t^3y^4-167196136166129664000\,ty^6-61514332179109458739 20\,t^5y^2-17099604835172352000\,t^2y^6-209707950610600427520\,t^6y^2-358185779955576798771200\,y^2-41042040868666311966720 00\,ty^2-19795201741037663944704 00\,t^2y^2-765032045424402235392 00\,t^4y^2-16736333230229579366400\,t^2y^4-51533459082977476608 0000\,t^3y^2-565599195902112694272 00\,ty^4-76423136719441314919219200\,t-72727729662480665804800\,y^4-472200714135906476359680 0\,t^4-19495735791572462705049600\,t^3-41766382944233979904 0\,y^6-735065201695823128166 40\,t^6-74047100664489638363136 0\,t^5-10813066203359084544 0\,t^8-42291103373137752883 20\,t^7-303992974847508480\,y^8-506653800654076576582528 00)x^{14}+(40122146777706690332590080 0\,t^2+587563796642565980160 0\,t^4y^4+24036700771741335552 0\,t^5y^4+31456192591590064128 0\,t^7y^2+59848616923103232000\,t^3y^6+319192623589883904 0\,ty^8+58577166305805327824 00\,t^3y^4+43854702091445678899 20\,ty^6+16065672953912446943232 0\,t^5y^2+877779714872180736000\,t^2y^6+10765008131344155279360\,t^6y^2+12615243903918931968 0\,t^9+28362456282719844722278400\,y^2+376095068953354463870976 00\,ty^2+21547071456049813782528000\,t^2y^2+13527533009281587609600 00\,t^4y^2+296939577848609164492800\,t^2y^4+69283206093631823806464 00\,t^3y^2+76364116145604699095040 0\,ty^4+53198649068678039407165440 0\,t+79549714824027082588160 0\,y^4+51176306452877714600755200\,t^4+17790591886746076997224000\,t^3+74355330567812363059200\,y^6+12958242616285686713548 80\,t^6+99162149968540360033532 80\,t^5+55507073177243300659 20\,t^8+11025978025437346922496 0\,t^7+15604972708838768640\,y^8+315552065422425037419315200)x^{13}+(-25934341420980544210993152 00\,t^2-14278184287039609896960 0\,t^4y^4-145881003750064128000\,t^4y^6-15560640400006840320\,t^2y^8-39059638754079670272 0\,t^6y^4-38337234721000390656 0\,t^8y^2-114574940345300366131 20\,t^5y^4-14994118468657930567680\,t^7y^2-28527840733345873920 00\,t^3y^6-152148483911177994240\,ty^8-96505362800797978460160 0\,t^3y^4-72496447303617053982720\,ty^6-263786893680990958387200 0\,t^5y^2-21379167269579768463360\,t^2y^6-26106718550107726282752 0\,t^6y^2-601326626086802423808 0\,t^9-18347221547560082352373760 0\,y^2-27653394875651848604221440 0\,ty^2-183346346114760301137100800\,t^2y^2-16887781485322757052825600\,t^4y^2-37227506620982290808832 00\,t^2y^4-700279822321618947932160 00\,t^3y^2-77560971953426405523456 00\,ty^4-30766326378686441148383232 00\,t-6806724714209071857664000\,y^4-43364567723943562680729600 0\,t^4-13039697702754674358091776 00\,t^3-935264336055881852518 40\,y^6-16113849369887808505774080\,t^6-99793797583111543471472640\,t^5-122998628063209586688\,t^{10}-13437910718501766561792 0\,t^8-18048980786969349351014 40\,t^7-38082438449044914176 0\,y^8-165102930765318755440394 2400-14186338826217062 4\,y^{10})x^{12}+(13844846870408898516772454400\,t^2+217137066301795451535360 0\,t^4y^4+64187641650028216320 00\,t^4y^6+68466817760030097408 0\,t^2y^8+171862410517950549196 80\,t^6y^4+16868383277240171888640\,t^8y^2+25700731716671297814528 0\,t^5y^4+335657809929956480778240\,t^7y^2+64137501808739305390080\,t^3y^6+34274194604140422758 40\,ty^8+111682519862946872426496 00\,t^3y^4+84173790245029366726656 0\,ty^6+30398006673580962695086080\,t^5y^2+326234012866276742922240\,t^2y^6+39568034052148643758080 00\,t^6y^2+10063524114262602547 2\,t^{11}+134379107185017665617920\,t^9+97574001707066898891407 3600\,y^2+16512499392804074117136384 00\,ty^2+124440276940433318718996 4800\,t^2y^2+15756296002236426328473 6000\,t^4y^2+34902437379041882485555200\,t^2y^4+550039038344280903411302400\,t^3y^2+61260522427881646718976000\,ty^4+14859263768878687989635481600\,t+465099667856680929984512 00\,y^4+29339319831198017305706496 00\,t^4+77803024262941632632979456 00\,t^3+$$

$$878612385407285267005440\,y^6+1496906963746673152072089 60\,t^6+78056221903098412825313 2800\,t^5+5411939634781221814272\,t^{10}+2030510338534051801989120\,t^8+2071780633271289665028096 0\,t^7+5819866690462070865920\,y^8+72778223041969824852869120 00+624198908353550745 6\,y^{10}+38337234721000390656 0\,t^9y^2+5021953554095957606 40\,t^7y^4+26258580675011543040 0\,t^5y^6+46681921200020520960\,t^3y^8+12767704943595356 16\,ty^{10})x^{11}+(-61294463046624587957246361600\,t^2-23034519721732792437964800\,t^4y^4-13228359748052481736704 0\,t^4y^6-14138105274207924387840\,t^2y^8-35338506110423034494976 0\,t^6y^4-34614711649026762080256 0\,t^8y^2-35827615939796249503334 40\,t^5y^4-46633754418603758714880 00\,t^7y^2-89714353538226104303616 0\,t^3y^6-48013900196312084643840\,ty^8-95981702792365176835276800\,t^3y^4-72485521796101034527948 80\,ty^6-25997888403690103441981440 0\,t^5y^2-34721688476074613774745 60\,t^2y^6-41797259176173823705743 360\,t^6y^2-69186728285555392512\,t^{12}+141863388262170624\,y^{12}-40589547260859163607040 0\,t^{11}-18613011436562141518233 60\,t^9-42690701895010986995220480 00\,y^2-80498551408330191585411072 00\,ty^2-68114059995316805733187584 00\,t^2y^2-11344555165850793632858112 00\,t^4y^2-25269965501501179275776000\,t^2y^4-34221076158619162647724032 00\,t^3y^2-38370722598176176723722 4000\,ty^4-60042034009625105503617024000\,t-25681455002814885270650880 0\,y^4-16046873754231711730552012800\,t^4-38073328893624470921124249600\,t^3-63602001069866835194675 20\,y^6-10732730511676031763480576 00\,t^6-48409877721476728554415718 40\,t^5-11086276342763957413478 4\,t^{10}-21365237780610174670602240\,t^8-17642117787014362149421056 0\,t^7-61757051042198684958720\,y^8-27031856507283943793151180800-12818145259421905715 2\,y^{10}-31628218644825322291 2\,t^{10}y^2-51788896026614562816 0\,t^8y^4-36105548428140871680 0\,t^6y^6-96281462475042324480\,t^4y^8-52666782892330844 16\,t^2y^{10}-15462684670803490897920\,t^9y^2-20255212668187029012480\,t^7y^4-10590960872254655692800\,t^5y^6-18828374884008276787 20\,t^3y^8-51496409939167936512\,ty^{10})x^{10}+(22515762753609415636856384000 0\,t^2+17996569273568470656614400 0\,t^4y^4+16821441288417394556928 00\,t^4y^6+18005212573617031741440 0\,t^2y^8+44784519924745311879168 00\,t^6y^4+43719144767441023795200 00\,t^8y^2+34551779582599188656947200\,t^5y^4+44782777688757668256153600\,t^7y^2+86804221190185634436864 00\,t^3y^6+46317788281649013719040 0\,ty^8+63174913753752948178944000\,t^3y^4+47701500802400126396006400\,ty^6+17016832748776190449281768 00\,t^5y^2+27182070673537887947980800\,t^2y^6+32497360504612629302476800 0\,t^6y^2+39915420164743495680\,t^{13}+25368467038036977254 40\,t^{12}-5201657569612922880\,y^{12}+75558247791572436910080\,t^{11}+17804364817175145558835200\,t^9+15289389136008170537222144000\,y^2+32018026421258240246415360000\,ty^2+30186956778123821844529152000\,t^2y^2+64164517797410929964482560 00\,t^4y^2+14389020974316066271395840 00\,t^2y^4+17028514998829201433296896000\,t^3y^2+19261091252111639529881600 0\,ty^4+20273892380462957844863385600 0\,t+11519991561441624299929600 00\,y^4+71387491675545882977107968000\,t^4+15323615761656146989311590400 0\,t^3+36113356605567476432896000\,y^6+60512347151845910693019648 00\,t^6+24070310631347567595828019200\,t^5+13959758577421606138675 20\,t^{10}+16539485425325964515082240 0\,t^8+11499354119652891175157760 00\,t^7+47708938947544691507200 0\,y^8+84392491833236816180281344000+15961207439363774873 60\,y^{10}+21564694530562719744 0\,t^{11}y^2+43157413355512135680 0\,t^9y^4+38684516173008076800 0\,t^7y^6+14442219371256348672 0\,t^5y^8+13166695723082711040\,t^3y^{10}-10639754119662796 80\,ty^{12}+11597013503102618173440\,t^{10}y^2+18989261876425339699200\,t^8y^4+13238701090318319616000\,t^6y^6+35303202907515518976 00\,t^4y^8+19311153727187976192 0\,t^2y^{10}+28845593040855635066880 0\,t^9y^2+37862685118310394107600\,t^7y^4+19842539622078722605056 0\,t^5y^6+35345263185519810969600\,t^3y^8+96136089445664292864 0\,ty^{10})x^9+(-68424386784062482726413926400 0\,t^2-10660766695945810005196800 00\,t^4y^4-14648212325843977686220800\,t^4y^6-15632253545056542130176 00\,t^2y^8-38870752030424087239065600\,t^6y^4-37785468674889282591129600\,t^8y^2-24295368519317473538642944 00\,t^5y^4-31336740486590749684531 2000\,t^7y^2-61159659015460247882956800\,t^3y^6-32203533789592666767360000\,ty^8-32375297192211149110640640 00\,t^3y^4-24376515708758046592204800 0\,ty^6-86622099026504755452051456 00\,t^5y^2-16099256520810042658652160 0\,t^2y^6-19143936842373214255448064 00\,t^6y^2-19244934722870425 60\,t^{14}+30399297484750848 0\,y^{14}-13172088654365353574 40\,t^{13}-42518389382759495761920\,t^{12}+91107820461705134080\,y^{12}-85662154906905310396416 0\,t^{11}-12404614068994473386311680 0\,t^9-44291078757893911621926912000\,y^2-10320337666805515112624947200 0\,ty^2-10806083917174656083165184000 0\,t^2y^2-28735619060524277418688512000\,t^4y^2-65006182975875178341335040 00\,t^2y^4-67920652750778599150190592000\,t^3y^2-77759943039730964024524800 00\,ty^4-56964931987434850921689907200 0\,t-41957476331255592166359040 00\,y^4-25858601597794748044463308800 0\,t^4-50660466195621182768676864000 0\,t^3-16228918785109238805954560 0\,y^6-27079099460266013545306521600\,t^6-96373113761986942019095756800\,t^5-12017946251593223252213760\,t^{10}-97025800384571269290393600 0\,t^8-58351191896422842453983232 00\,t^7-27357064145066636191296 00\,y^8-22025623726373501393489100 8000-12971177574759955169280\,y^{10}-71163491950856975155 20\,t^{11}y^2-14241946407319004774400\,t^9y^4-12765890337092665344000\,t^7y^6-47659323925145950617 60\,t^5y^8-43450095886172946432 0\,t^3y^{10}-35111188594887229440\,ty^{12}-19470775302577553670144 0\,t^{10}y^2-31946640568574395023360 0\,t^8y^4-22322857074838562930688 0\,t^6y^6-59645131625556468101120 0\,t^4y^8-32445930187911698841 60\,t^2y^{10}-32789358575580767846400 00\,t^9y^2-43185072784575836454912 00\,t^7y^4-22708945739363482651852 80\,t^5y^6-40511728290638321418240 0\,t^3y^8-10773815021570548039680\,ty^{10}-12130140673441529856 0\,t^{12}y^2-29131254014970691584 0\,t^{10}y^4-32640060520975564800 0\,t^8y^6-16247496792663392256 0\,t^6y^8-22218799032702074880\,t^4y^{10}+3590917015386193920\,t^2y^{12})x^8+(17089479596230455276506972160 00\,t^2+48562945788316723665960960 00\,t^4y^4+91739488523190371824435200\,t^4y^6+96610601368778000302080 00\,t^2y^8+24295368519317473538642944 00\,t^6y^4+23502555364943062263398400 0\,t^8y^2+12792920035134972006236160 00\,t^5y^4+16409088722034183647526912 00\,t^7y^2+32198513041620085317304320 0\,t^3y^6+16414238487039817914777600\,ty^8+13001236595175035668267008000\,t^3y^4+97373512710655432835727360 0\,ty^6+34482742872629132902426214400\,t^5y^2+73129547126274139776614400 0\,t^2y^6+86622099026504755452051456 00\,t^6y^2+7697973888914817024\,t^{15}+56451808518708658176 0\,t^{14}-89171272621935820 80\,y^{14}+19623872022812074967040\,t^{13}+42831077453452655198208 0\,t^{12}-10119588362701504512 00\,y^{12}+65552434099593993955752960\,t^{11}+64683866923047512860262400 0\,t^9+10148355829049793673638707200 0\,y^2+26574647254736346973156147200 0\,ty^2+30961013000416545337874841600 0\,t^2y^2+10188097912616789872528588800 0\,t^4y^2+23327982911919289207357440000\,t^2y^4+21612167834349312166330368000 0\,t^3y^2+25174485798753355299815424000\,ty^4+13215374235824100836093460480 00\,t+12326152141476598822993920 00\,y^4+$$

$$75990699293431774153015296000\,t^4+136848773568124965452827852800\,t^3+57868865601748590814822400\,y^6+$$
$$96373113761986942019095756800\,t^6+3103032191735369765335597056000\,t^5+74427684413966840317870080\,t^{10}+$$
$$43763393922317131840487424000\,t^8+232106566802280116102627328000\,t^7+1162516693828937459576000\,y^8+$$
$$47612764809887935337437593600 0+67342955732018858557440\,y^{10}+10620422892315029274624 0\,t^{11}y^2+$$
$$21297760379049596682240 0\,t^9y^4+19133877492718768226304 0\,t^7y^6+71574157950677617213440\,t^5y^8+$$
$$64891860375823397683200\,t^3y^{10}-54664692277023080448 0\,ty^{12}+19673615145348460707840 00\,t^{10}y^2+$$
$$32388804588431877341184 00\,t^8y^4+22708945739363482651852 80\,t^6y^6+60767592435957482127360 0\,t^4y^8+$$
$$32321445064711644119040\,t^2y^{10}+25190312449926188394086400\,t^9y^2+33317787454649217633484800\,t^7y^4+$$
$$17577854791012773223464960\,t^5y^6+31264507090113084260352 00\,t^3y^8+77827065448559731015680\,ty^{10}+$$
$$55985264646653214720\,t^{13}y^2+15889774917256740864 0\,t^{11}y^4+21760040347317043200 0\,t^9y^6+13926425822282907648 0\,t^7y^8+$$
$$26662558839242489856\,t^5y^{10}-7181834030772387840\,t^3y^{12}-182395784985050880\,ty^{14}+35581745975428487577 60\,t^{12}y^2+$$
$$85451678443914028646 40\,t^{10}y^4+95744177528194990080 00\,t^8y^6+47659323925145950617 60\,t^6y^8+$$
$$65175143829259419648 0\,t^4y^{10}-10533356578466168832 0\,t^2y^{12})x^7+(-34690357369038264694745333760 00\,t^2-$$
$$17064123031167234314600448000\,t^4y^4-42260548367126361978961920 0\,t^4y^6-43087376028479522026291200\,t^2y^8-$$
$$11193805030743105050545664000\,t^6y^4-10768464473834933018689536 00\,t^8y^2-50991093077732559849259008 00\,t^5y^4-$$
$$64966574269878566589038592 00\,t^7y^2-12797670747097974460907520 00\,t^3y^6-61032126426019216647782400\,ty^8-$$
$$40823970095858756112875520000\,t^3y^4-30381154440918010177781760 00\,ty^6-10697502808247629366155018240 0\,t^5y^2-$$
$$25560547086547051119378432 00\,t^2y^6-30172400013550491289622937600\,t^6y^2-2525897682300174336\,t^{16}+$$
$$25332747903959040 0\,y^{16}-197581329815480303616\,t^{15}-735895200855452811264 0\,t^{14}+12168726193155080192 0\,y^{14}-$$
$$17297165894663572291584 0\,t^{13}-28679189918574737306419 20\,t^{12}+80340614472587752243 20\,y^{12}-$$
$$35522303924847810151710720\,t^{11}-25528646454684993573617664 00\,t^9-17627232345147456075333632000 0\,y^2-$$
$$53278868102511416786603212800 0\,ty^2-69758449043682910804534886400 0\,t^2y^2-28365970282583472218308608000 0\,t^4y^2-$$
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$$17771834633551809085440 0\,y^{10}-93896799557344926105600 0\,t^{11}y^2-18893469343251928449024 00\,t^9y^4-$$
$$17031709304522611988888960\,t^7y^6-63805972057755356233728 0\,t^5y^8-56562528863245377208320\,t^3y^{10}+$$
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$$15380622942136176570531840\,t^6y^6-41034665555773423091712 00\,t^4y^8-20429604680246929391616 0\,t^2y^{10}-$$
$$13709823962883452986924000\,t^9y^2-18221526389488076539822 0800\,t^7y^4-96326462949349890415656960\,t^5y^6-$$
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$$94261571653887590400\,t^4y^{12}+47878893538482585600\,t^2y^{14}-14369551259307658444 80\,t^{13}y^2-40783755620958968217 60\,t^{11}y^4-$$
$$55850770224780410880 00\,t^9y^6\;-\;35744492943859462963 20\,t^7y^8\;-\;68433901020722390630 4\,t^5y^{10}\;+$$
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$$12556607104596691648512 0\,t^8y^6-62627388206842915061760\,t^6y^8-85170566743268209459 20\,t^4y^{10}+$$
$$14349481722718558617 60\,t^2y^{12})x^6+(56242578431680123617348157440 00\,t^2+45926966357841100626984960000\,t^4y^4+$$
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$$47854479043316517175296 0\,t^6y^8+63632844971151049359360\,t^4y^{10}-11953763753441152204800\,t^2y^{12}+$$
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$$14997689347073900544\,t^7y^{10}-84835414488498831 36\,t^5y^{12}-71818340307723878 40\,t^3y^{14}-11399736556781568 00\,ty^{16})x^5+$$
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0t^9y^6-25636328058919562724800\,t^7y^8-47724633728363287019520\,t^5y^{10}+14942204691801440256000\,t^3y^{12}+37739038977457913856 00ty^{14}-16906850330383698888665600\,t^{12}y^2-40996496282087904509952 00t^{10}y^4-46347859312240710647808 00t^8y^6-23081999375122550489088 00t^6y^8-28729131581597244456960 0t^4y^{10}+67787393461245915955200\,t^2y^{12}-1476173970175426560\,t^{16}y^2-6445671916555468800\,t^{14}y^4-14604572534243328000\,t^{12}y^6-17136031773512171520\,t^{10}y^8-703016688144089088 0t^8y^{10}+5302213405531176960\,t^6y^{12}+6732969403849113600\,t^4y^{14}+21374506043965440 00t^2y^{16}-11546960833372225536 0t^{15}y^2-44117043339979653120 0t^{13}y^4-85680158867560857600 0t^{11}y^6-83776155331706163200\,t^9y^8-27495763802968817664 0t^7y^{10}+15553159322891452416 0t^5y^{12}+13166695723082711040 0t^3y^{14}+20899517020766208000\,ty^{16})x^4+(66445904991252152153486131200 00t^2+13650250516049280337182720000 0t^4y^4+64085247648811427718754800 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0t^4y^8-14621697298595340877824 00t^2y^{10}+30307098227896698840023040 00t^9y^2+41136725164421011294126080 00t^7y^4+21566711604274074381975552 00t^5y^6+30013856052143665132339200 0t^3y^8-14008547521567580907110400\,ty^{10}+21765226545744445440000\,t^{14}y^2+72460748901676430131200\,t^{12}y^4+11975420604742461554688 0t^{10}y^6+96136230220948360396800\,t^8y^8+23862316864181643509760\,t^6y^{10}-11206653518851080192000\,t^4y^{12}-56608558466186787084 00t^2y^{14}+39015808454731612815360 0t^{13}y^2+11180862622387610320896 00t^{11}y^4+15449286437413570215936 00t^9y^6+98922854464810930667520 0t^7y^8+17237478948958346674176 0t^5y^{10}-67787393461245915955200\,t^3y^{12}-16596665346785751859200\,ty^{14}+52580290766740515717120\,00t^{12}y^2+12812010742608803817062400\,t^{10}y^4+14513473770270351792537600\,t^8y^6+71325795541793133035520 00t^6y^8+74577062304794321879040 0t^4y^{10}-27287802723447078912 0000t^2y^{12}+260501288854487040\,t^{17}y^2+1289134383311093760\,t^{15}y^4+337028596944076800 0t^{13}y^6+46734632109578649 60t^{11}y^8+23433889604802969 60t^9y^{10}-22723771737990758 40t^7y^{12}-40397816423094681 60t^5y^{14}-21374506043965440 00t^3y^{16}-354658470655426560\,ty^{18}+21650551562572922880\,t^{16}y^2+94536521442813542400\,t^{14}y^4+21420039716890214400 0t^{12}y^6+25132846601151148896 0t^{10}y^8+10131091142611330662 40t^8y^{10}-77765796614457262080\,t^6y^{12}-98750217923120332800\,t^4y^{14}-31349275531149312000\,t^2y^{16}+86163286686450057216 0t^{15}y^2+32986861164010930176 00t^{13}y^4+64209922693960355020 80t^{11}y^6\,+\,62906974761337749504 00t^9y^8\,+\,20532190197037871923 20t^7y^{10}\,-\,12107375203543783833 60t^5y^{12}-10267362725474592 9100t^3y^{14}-16631793423879241728 0ty^{16})x^3+(-43049853660705992906637312000\,00t^2-13669663141681494365306880000\,0t^4y^4-77506298985653125754388480000\,0t^4y^6-20845658680410279562444800 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$$269227656793028793729024000\,ty^8-22034024598713170724388864000\,t^3y^4-18162086942448288264093696000\,ty^6-$$
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$$8087516851602777893240832000\,t^6y^6-16882794029330811636940800\,0\,t^4y^8+15759615961763528502499200\,t^2y^{10}-$$
$$4029472318954882713255936000\,t^8y^2-55358396949183469505740800000\,t^7y^4-28838361441965142473441280000\,t^5y^6-$$
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$$9100434940397396951040000\,t^{13}y^2-26206385609881644171264000\,t^{11}y^4-36283684425675879481344000\,t^9y^6-$$
$$2292614856700493561856000\,t^7y^8-335596780371574448455680\,t^5y^{10}+204658520425853091840000\,t^3y^{12}+$$
$$4686457031240806563840000\,ty^{14}-10324877158861619016499200\,t^{12}y^2-25298499092918279602176000\,t^{10}y^4-$$
$$2865321778239873314979840000\,t^8y^6-13633115071511098766131200\,t^6y^8-84346793280333781401600000\,t^4y^{10}+$$
$$7667234813360147005440000\,t^2y^{12}-2865514177399357440\,t^{17}y^2-14180478216422031360\,t^{15}y^4-37073145663848448000\,t^{13}y^6-$$
$$5140809532053651456000\,t^{11}y^8-257772785652832665600\,t^9y^{10}+249961489117898342400\,t^7y^{12}+444375980654041497600\,t^5y^{14}+$$
$$2351195664836198400\,0\,t^3y^{16}+39012431772096921600\,ty^{18}-12116712190282039296000\,t^{16}y^2-5301459829930328064000\,t^{14}y^4-$$
$$1203936050511756656640\,t^{12}y^6-14154069321300993638400\,t^{10}y^8-577467849291690147840\,t^8y^{10}+$$
$$4540265701328918937600\,t^6y^{12}+57753915330794618880\,0\,t^4y^{14}+1871076760186414694400\,t^2y^{16}-3264783981861666816000\,t^{15}y^2-$$
$$1254128346375168983040\,0\,t^{13}y^4-24495178509700489543680\,t^{11}y^6-24034057555237090099200\,t^9y^8-$$
$$7670030420629813985280\,t^7y^{10}+5042994083482986086400\,t^5y^{12}+424564188496401530880\,0\,t^3y^{14}+$$
$$709874261764702188800\,ty^{16}-32562661106810880\,t^{18}y^2-1812845226531225600\,t^{16}y^4-541653102231552000\,t^{14}y^6-$$
$$876274352054599680\,t^{12}y^8-527262516108066816\,t^{10}y^{10}+63910608013099008\,0\,t^8y^{12}+1514918115866050560\,t^6y^{14}+$$
$$1202315964973056000\,t^4y^{16}+398990779487354880\,t^2y^{18})x^2+(167538123444544459706990592000\,0\,t^2+$$
$$8262759224517439021645824000\,0\,t^4y^4+57277079490899560366080000000\,t^4y^6-20192074259477159529676800\,0\,t^2y^8+$$
$$153565318305554403793305600000\,t^6y^4+13775987840151160614813696000\,t^8y^2+41008989425044483095920640000\,t^5y^4+$$
$$472971627165595628501729280000\,t^7y^2+10498959712563578277986304000\,t^3y^6-75591717453198253463961600\,0\,ty^8+$$
$$1189123779439032325373952000\,0\,t^3y^4+11154792271743149018185728000\,ty^6+25098149178930655232262144000\,0\,t^5y^2+$$
$$136215652068362161980702720\,0\,t^2y^6+126433251454201897257271296000\,t^6y^2+11579133560667627847680\,t^{16}-$$
$$208909601814742040576\,0\,y^{16}+161011728948937516646400\,t^{15}+18156046361319696236544000\,t^{14}-$$
$$855467756418280456192\,00\,y^{14}+168513913510485446098944\,00\,t^{13}+1299419979811946628120576\,00\,t^{12}-$$
$$315106012252011642224640\,0\,y^{12}+836773688206840964317184\,00\,t^{11}+202967846539638468048322560\,00\,t^9-$$
$$2644544666141553199782297600\,00\,y^2-429788370695701757543055360000\,ty^2-167124944735334319395962880000\,t^2y^2+$$
$$333471830967655308302745600000\,t^4y^2+1104710140003485669654528000\,00\,t^2y^4+2029720025885859533926656000\,00\,t^3y^2+$$
$$52681238062277818035732480000\,ty^4+74189787444956887460610048000\,0\,t+4589971349874067636224000000\,y^4+$$
$$18687910778789667793167974400\,00\,t^4+215249268303529964533186560000\,0\,t^3+41338585069874134741155840000\,y^6+$$
$$59318344439662630377671848800\,0\,t^6+11959403883758437675177082880\,00\,t^5+45082372871835744919879680\,00\,t^{10}+$$
$$176738127717888\,t^{21}+18145114445703168\,t^{20}-222928181554839552\,y^{20}+901090715540520960\,t^{19}+$$
$$2874438758591594496\,0\,t^{18}-333491552406785228800\,y^{18}+6598939432495664332800\,t^{17}+760390052835205193882664960000\,t^8+$$
$$2352052689920842165408235520000\,t^7-76841213191199512539955200\,0\,y^8+11777310696798643575324672000\,0-$$
$$8552941494080447646269440\,0\,y^{10}+92987687744683053259161600\,t^{11}y^2+19282839920822349044121600\,0\,t^9y^4+$$
$$1733039325343452405694464000\,t^7y^6+5064838208799243491082240\,00\,t^5y^8-787980798088176426024960\,0\,t^3y^{10}-$$
$$3011263210946964750336000\,ty^{12}+60442084784323240698839040\,0\,t^{10}y^2+10379699427971900532326400000\,t^8y^4+$$
$$7209590360491285618360320000\,t^6y^6+113114398260326628851712000\,t^4y^8-365485752974723203989500400\,t^2y^{10}+$$
$$3205417958829884555919360000\,t^9y^2+448051761408476465174937600\,0\,t^7y^4+232518896956959377263165440\,00\,t^5y^6+$$
$$1042282934020513978122240000\,t^3y^8-85033266036231020897894400\,ty^{10}+9750466007568639850400\,0\,t^{14}y^2+$$
$$3275798201235205521408000\,t^{12}y^4+5442552663851381922201600\,t^{10}y^6+429865285631342542848000\,t^8y^8+$$
$$8389919509289361211392\,0\,t^6y^{10}-76746945159694909440000\,t^4y^{12}-3514842773430604922880\,0\,t^2y^{14}+$$
$$1191331979868648348057600\,t^{13}y^2+34497953308524926730240000\,t^{11}y^4+47755362970664555249664000\,t^9y^6+$$
$$2921381801038092592742400\,t^7y^8+25304037984100134420480\,0\,t^5y^{10}-38336174066800735027200\,0\,t^3y^{12}-$$
$$7998257830221179781120\,0\,ty^{14}+1167944894322657114193920\,0\,t^{12}y^2+2881053668593985315143680\,0\,t^{10}y^4+$$
$$3253872061465688958566400\,0\,t^8y^6+144832096889869820755960\,00\,t^6y^8-411235236522993962188800\,t^4y^{10}-$$
$$1355145963134720252313600\,t^2y^{12}+1069121663848415232\,0\,t^{17}y^2+5301459829930328064\,0\,t^{15}y^4+$$
$$1389156981359719219\,20\,t^{13}y^6+193010036199559004160\,t^{11}y^8+9624464154861502464\,0\,t^9y^{10}-9729140788561969152\,0\,t^7y^{12}-$$
$$1732617459923885664\,0\,t^5y^{14}-935538380093207347\,20\,t^3y^{16}-16314289650149621760\,ty^{18}+3060734982995312640\,00\,t^{16}y^2+$$
$$1343708942544823910400\,t^{14}y^4+3061897313712561192960\,t^{12}y^6+360510863328556351488\,0\,t^{10}y^8+$$
$$1438130703868090122240\,t^8y^{10}-1260748520870746521600\,t^6y^{12}-1592115706861505740800\,t^4y^{14}-$$

$$532405696323555164160\,t^2y^{16}+62703977873675806310 40\,t^{15}y^2+24189366250357810790400\,t^{13}y^4+$$
$$474012197511552722534 40\,t^{11}y^6+46370088030380123750400\,t^9y^8+13851545583984385720320\,t^7y^{10}-$$
$$114391226465852483174 40\,t^5y^{12}-93356242575669854208 00\,t^3y^{14}-16233900396801058406 40\,ty^{16}+$$
$$25707364031692805\,t^{19}y^2+15995693175275520\,t^{17}y^4+54165310223155200\,t^{15}y^6+101108579083223040\,t^{13}y^8+$$
$$71899434014736384\,t^{11}y^{10}-106517680218316807\,t^9y^{12}-324625310542725120\,t^7y^{14}-360694789491916800\,t^5y^{16}-$$
$$199495389743677440\,t^3y^{18}-45598946227126272\,ty^{20}+23879284811661312 0\,t^{18}y^2+13294198327895654 40\,t^{16}y^4+$$
$$39721227496980480 00\,t^{14}y^6+64260119150670643 20\,t^{12}y^8+38665917847924899 84\,t^{10}y^{10}-46867779209605939 20\,t^8y^{12}-$$
$$11109399516351037440\,t^6y^{14}-881698374313574400 0\,t^4y^{16}-29259323829072691 20\,t^2y^{18})x-34053913017090540495175680 00\,t^3y^6+$$
$$57630909893399634404966400 0\,ty^8-31003938802405601055866880 00\,ty^6-50020774645148296245411840000\,t^5y^2-$$
$$27821170291858832797728768 0000\,t^2-27617753500087141741363200000\,t^3y^4-19685549461056709271224320 00\,t^4y^6+$$
$$28346894044949345048985600 0\,t^2y^8-51261236781305603869900800 00\,t^6y^4-44341090046774590172037120 00\,t^8y^2-$$
$$12394138836776158532468736000\,t^5y^4-13546419798664488991850496000\,t^7y^2-40359237806911868349972480000 0\,t^4-$$
$$41884530861136114926747648000 0\,t^3-80080088439903772842393600 0\,y^6-14949254854698047093971353600 0\,t^6-$$
$$28031866168184501689751961600 0\,t^5\,-\,15222588490472885103624192 00\,t^{10}\,-\,6025163444928\,t^{22}\,-$$
$$22296070864481856100761600000\,t^4y^4+3377699720527872\,y^{22}-648039801632256\,t^{21}-33790901832769536\,t^{20}+$$
$$58096435193079398 4\,y^{20}-11346468783914188 80\,t^{19}-27495580968731934720\,t^{18}+46071824188000174080\,y^{18}-$$
$$51084412767651299328 0\,t^{17}-22050493968007895300702208000\,t^8-63555369042495675404648448000\,t^7+$$
$$49353672671758812971008 0000\,y^8-41830471019036808818196480 00\,t^2y^6-31372686473663319040327680000\,t^6y^2-$$
$$75474247944814460928 00\,t^{16}+18401933257417215180 80\,y^{16}-90780231806598481182720\,t^{15}-90275310809188631838720 0\,t^{14}+$$
$$66281277155862537830400\,y^{14}-74966537296843074699264 00\,t^{13}-52298585551292756026982400\,t^{12}+$$
$$23413672341894063980544 00\,y^{12}-30737981503524371536281 6000\,t^{11}-63365837736267099490222080 00\,t^9+$$
$$97174929823379754602987520 000\,y^2+19834084996061648998367232 0000\,ty^2+16117063901088815907864576 0000\,t^2y^2-$$
$$38057250485359866261012480 000\,t^4y^2-19755464273354181763399680 000\,t^2y^4+41781236183833579848990720 000\,t^3y^2-$$
$$34424785124055507271680000\,ty^4-88329830225989826814935040000\,t+38968112185933940601651200 00\,y^4+$$
$$59093356059833796028006400\,y^{10}-41210512352947664112844800\,t^{11}y^2-86497495233099171102720000\,t^9y^4-$$
$$77245611005263774482432000\,t^7y^6-16967159739048994327756800\,t^5y^8+91371438243680800997376 00\,t^3y^{10}+$$
$$23632950918900873166848 00\,ty^{12}-24040634691224134169395200 0\,t^{10}y^2-42004852632044668610150400 0\,t^8y^4-$$
$$29064862119619922157895680 0\,t^6y^6-19542805012884637089792000\,t^4y^8+31887474763586632836710400\,t^2y^{10}-$$
$$11479989866792633845678080 00\,t^9y^2-16453426961309400406425600 00\,t^7y^4-85915619236349340549120000 0\,t^5y^6+$$
$$50480185648692898824192000\,t^3y^8+64147061205603357347020800\,ty^{10}-63821356064391875788800\,t^{14}y^2-$$
$$21561220817828079206400 0\,t^{12}y^4-35816522227998416437248 0\,t^{10}y^6-27387954384732118056960 0\,t^8y^8-$$
$$31630047480125168025600\,t^6y^{10}+71880326375251378176000\,t^4y^{12}+29993466863329424179200\,t^2y^{14}-$$
$$67381436210922525818880 0\,t^{13}y^2-19643547740413536236961600\,t^{11}y^4-27115600512214074654720 00\,t^9y^6-$$
$$15517724666771766509568 00\,t^7y^8+61685285478449094328320\,t^5y^{10}+33878649078368006307840 0\,t^3y^{12}+$$
$$64160081731371034214400\,ty^{14}-58117304840426908286976 00\,t^{12}y^2-14462129940616761783091200\,t^{10}y^4-$$
$$16247243675094866303385600\,t^8y^6-63310477609990543638528 00\,t^6y^8+14774639964153307987968 00\,t^4y^{10}+$$
$$11292237041051117813760 00\,t^2y^{12}-13503242572038144000\,t^{17}y^2-67185447127241195520\,t^{15}y^4-$$
$$17664792194495545344 0\,t^{13}y^6-24580286136037933056 0\,t^{11}y^8-11984422532234084352 0\,t^9y^{10}+13508019866472284160 0\,t^7y^{12}+$$
$$23881735602922586112 0\,t^5y^{14}+13310142408088879104 0\,t^3y^{16}+25011866430508892160\,ty^{18}-29392489628285534208 0\,t^{16}y^2-$$
$$12958589062691684352 00\,t^{14}y^4-29625762344472045158 40\,t^{12}y^6-34777566022785092812 80\,t^{10}y^8-$$
$$12985823984985361612 80\,t^8y^{10}+14298903308231560396 80\,t^6y^{12}+17504295482938097664 00\,t^4y^{14}+$$
$$60877126488003969024 0\,t^2y^{16}-48752330037843197952 00\,t^{15}y^2-18898835776356954931200\,t^{13}y^4-$$
$$37108313617168513105920\,t^{11}y^6-35822107135945211904000\,t^9y^8-89891994742386012979 20\,t^7y^{10}+$$
$$11512041773954236416000\,t^5y^{12}+87871069335765123072 00\,t^3y^{14}+15668220136105653043 20\,ty^{16}-$$
$$96402615118848\,t^{20}y^2-666487215636480\,t^{18}y^4-25389989167104 00\,t^{16}y^6-54165310223155200\,t^{14}y^8-$$
$$4493714625921024\,t^{12}y^{10}+7988826001637376\,t^{10}y^{12}+30433622863380480\,t^8y^{14}+45086848686489600\,t^6y^{16}+$$
$$37405385576939520\,t^4y^{18}+17099604835172352\,t^2y^{20}-9426033478287360\,t^{19}y^2-58650874976010240\,t^{17}y^4-$$
$$198606137484902400\,t^{15}y^6-370731456638484480\,t^{13}y^8-263631258054033408\,t^{11}y^{10}+390564826746716160\,t^9y^{12}+$$
$$11902928053233254 40\,t^7y^{14}+13225475614703616 00\,t^5y^{16}+73148309572681728 0\,t^3y^{18}+16719613616612966 4\,ty^{20}-$$
$$44546735993683968 0\,t^{18}y^2-24850592952798412 80\,t^{16}y^4-74419124001413529 60\,t^{14}y^6-12063127262472437760\,t^{12}y^8-$$
$$72183481161461268 48\,t^{10}y^{10}+91210694892768460 80\,t^8y^{12}+21657718249047982080\,t^6y^{14}+17541344626747637760\,t^4y^{16}+$$
$$61178586188061081 60\,t^2y^{18}$$
and
$$d_3(x,y,t)=16777216\,x^{12}+(-738197504-150994944\,t)x^{11}+(6090129408\,t+15435038720+622854144\,t^2+$$
$$100663296\,y^2)x^{10}+(-754974720\,ty^2-1557135360\,t^3-200991047680-3690987520\,y^2-22837985280\,t^2-$$
$$115762790400\,t)x^9+(251658240\,y^4+64760053760\,y^2+51385466880\,t^3+2627665920\,t^4+1799188643840+$$
$$1356689571840\,t\,+\,390699417600\,t^2\,+\,2548039680\,t^2y^2\,+\,24914165760\,ty^2)x^8\,+\,(-7381975040\,y^4\,-$$
$$10795131863040\,t-4070068715520\,t^2-1509949440\,ty^4-708669603840\,y^2-11563863900160-781398835200\,t^3-$$
$$388560322560\,ty^2\,-\,5096079360\,t^3y^2\,-\,77078200320\,t^4\,-\,3153199104\,t^5\,-\,74742497280\,t^2y^2)x^7\,+$$
$$(38755368960\,ty^4\,+\,335544320\,y^6\,+\,1019970846720\,t^2y^2\,+\,103347650560\,y^4\,+\,28337221140480\,t^2\,+$$
$$6688604160\,t^4y^2\,+\,607102854758 40\,t\,+\,130799370240\,t^3y^2\,+\,3963617280\,t^2y^4\,+\,80932110336\,t^5\,+$$
$$2759049216\,t^6+1025585971200\,t^4+542937553305 60+7122620252160\,t^3+5308311142400\,y^2+3720515420160\,ty^2)x^6+$$
$$(-8371159695360\,t^2y^2-1529956270080\,t^3y^2-6019743744\,t^5y^2-1509949440\,ty^6-1773674496\,t^7-$$
$$23887400140800\,ty^2-186336485048320-244321898987520\,t-136598142320640\,t^2-42505831710720\,t^3-$$
$$28245114224640\,y^2\,-\,87199580160\,t^2y^4\,-\,890534625280\,y^4\,-\,5945425920\,t^3y^4\,-\,923027374080\,t^5\,-$$
$$14714929155 20\,t^4y^2\,-\,60699082752\,t^6\,-\,8012947783680\,t^4\,-\,465064427520\,ty^4\,-\,7381975040\,y^6)x^5\,+$$
$$(458103560601600\,t^2+5573836800\,t^4y^4+108999475200\,t^3y^4+27682406400\,ty^6+110361968640\,t^5y^2+$$
$$2831155200\,t^2y^6+3762339840\,t^6y^2+107786901913600\,y^2+105919178342400\,ty^2+44788875264000\,t^2y^2+$$

$$1434334003200\,t^4y^2+871995801600\,t^2y^4+10463949619200\,t^3y^2+3339504844800\,ty^4+698761818931200\,t+5106984550400\,y^4+39849217228800\,t^4+170747677900800\,t^3+75833016320\,y^6+576892108800\,t^6+6009710837760\,t^5+831409920\,t^8+32517365760\,t^7+251658240\,y^8+460685574144000)x^4+(-1048142728396800\,t^2-81749606400\,t^4y^4-3344302080\,t^5y^4-1612431360\,t^7y^2-2831155200\,t^3y^6-754974720\,ty^8-871995801600\,t^3y^4-227499048960\,ty^6-860600401920\,t^5y^2-41523609600\,t^2y^6-55180984320\,t^6y^2-277136640\,t^9-292272524492800\,y^2-323360705740800\,ty^2-158878767513600\,t^2y^2-7847962214400\,t^4y^2-5009257267200\,t^2y^4-44788875264000\,t^3y^2-15320953651200\,ty^4-1382056722432000\,t-19704840192000\,y^4-128060758425600\,t^4-458103560601600\,t^3-459024629760\,y^6-3004855418880\,t^6-23909530337280\,t^5-12194012160\,t^8-247239475200\,t^7-3690987520\,y^8-792542262067200)x^3+(1554813812736000\,t^2+490497638400\,t^4y^4+1592524800\,t^4y^6+849346560\,t^2y^8+1254113280\,t^6y^4+453496320\,t^8y^2+36787322880\,t^5y^4+17736744960\,t^7y^2+31142707200\,t^3y^6+8304721920\,ty^8+3756942950400\,t^3y^4+1032805416960\,ty^6+3531582996480\,t^5y^2+255936430080\,t^2y^6+322725150720\,t^6y^2+3048503040\,t^9+544467635404800\,y^2+657613180108800\,ty^2+363780793958400\,t^2y^2+25193742336000\,t^4y^2+17236072857600\,t^2y^4+119159075635200\,t^3y^2+44335890432000\,ty^4+1783220089651200\,t+49143821107200\,y^4+257683252838400\,t^4+786107046297600\,t^3+1727382159360\,y^6+8966073876480\,t^6+57627341291520\,t^5+62355744\,t^{10}+69536102400\,t^8+965846384640\,t^7+23488102400\,y^8+100663296\,y^{10}+891610044825600)x^2+(-1337415067238400\,t^2-1408853606400\,t^4y^4-11678515200\,t^4y^6-6228541440\,t^2y^8-9196830720\,t^6y^4-3325639680\,t^8y^2-147149291520\,t^5y^4-69155389440\,t^7y^2-127968215040\,t^3y^6-35232153600\,ty^8-8618036428800\,t^3y^4-2591073239040\,ty^6-7558122700800\,t^5y^2-774604062720\,t^2y^6-882895749120\,t^6y^2-8503056\,t^{11}-11589350400\,t^9-634836431667200\,y^2-816701453107200\,ty^2-493209885081600\,t^2y^2-44684653363200\,t^4y^2-33251917824000\,t^2y^4-181890396979200\,t^3y^2-73715731660800\,ty^4-1337415067238400\,t-71259547238400\,y^4-294790142361600\,t^4-777406906368000\,t^3-3871845908480\,y^6-14406835322880\,t^6-77304975851520\,t^5-457275456\,t^{10}-181096197120\,t^8-1921301544960\,t^7-76168560640\,y^8-738197504\,y^{10}-75582720\,t^9y^2-268738560\,t^7y^4-477757440\,t^5y^6-424673280\,t^3y^8-150994944\,ty^{10}-594406696550400)x+8312979456000\,t^3y^4+57126420480\,ty^8+944765337600\,t^6y^2+531441\,t^{12}+193651015680\,t^3y^6+16777216\,y^{12}+31177872\,t^{11}+15091349760\,t^9+356725555200000\,y^2+476127323750400\,ty^2+306263044915200\,t^2y^2+34104449433600\,t^4y^2+2903884431360\,ty^6+6702698004480\,t^5y^2+971652464640\,t^2y^6+445805022412800\,t+46939294924800\,y^4+145763794944000\,t^4+334353766809600\,t^3+4160078479360\,y^6+9663121981440\,t^6+44218521354240\,t^5+869201280\,t^{10}+180122019840\,t^8+1543589498880\,t^7+27643399372800\,t^2y^4+123302471270400\,t^3y^2+53444660428800\,ty^4+501530650214400\,t^2+1615881830400\,t^4y^4+23994040320\,t^4y^6+13212057600\,t^2y^8+18393661440\,t^6y^4+6483317760\,t^8y^2+211328040960\,t^5y^4+94595973120\,t^7y^2+108045271040\,y^8+1677721600\,y^{10}+5668704\,t^{10}y^2+25194240\,t^8y^4+59719680\,t^6y^6+79626240\,t^4y^8+56623104\,t^2y^{10}+277136640\,t^9y^2+985374720\,t^7y^4+1751777280\,t^5y^6+1557135360\,t^3y^8+553648128\,ty^{10}+198135565516800.$$