

Differensial tenglamalar

1. Oddiy differensial tenglama tushunchasi. Integral egri chiziq.
2. O'zgaruvchilari ajralgan va unga keltiriladigan differensial tenglamalar
3. O'zgaruvchilarga nisbatan bir jinsli differensial tenglamalar.
4. O'zgaruvchilarga nisbatan bir jinsli differensial tenglamalarga keltiriladigan tenglamalar.
5. Chiziqli differensial tenglamalarni yechishning Lagranj usuli
6. Chiziqli differensial tenglamalarni yechishning Eyler-Bernulli usuli
7. Chiziqli differensial tenglamalarni yechishning integralovchi ko'paytuvchi usuli
8. Bernulli va Rikatti tenglamalari
9. To'la differensial tenglamalar.
10. Integrallovchi ko'paytuvchini topish usullari.
11. Birinchi tartibli tenglama uchun Koshi masalasi. Pikar teoremasi.
12. Hosilaga nisbatan yechilmagan differensial tenglamalar va uni yechish usullari.
13. Lagranj va Klero tenglamalari.
14. Yuqori tartibli tenglama uchun Koshi masalasi. Pikar teoremasi.
15. Lagranj va Klero tenglamalari
16. Yuqori tartibli differensial tenglama haqida tushuncha. Koshi masalasining qo'yilishi.
17. Yuqori tartibli tenglamalarni integrallash usullari. Kvadraturalarda integrallanadigan tenglamalar.
18. Yuqori tartibli differensial tenglamalarni integrallashning tartibini pasaytirish usuli.
19. Umumlashgan bir jinsli va chap tomon to'la hosiladan iborat bo'lgan tenglamalarni integrallash.
20. Chiziqli bog'liq va erkli funksiyalar.
21. Vronskiy determinanti.
22. Yuqori tartibli bir jinsli chiziqli differensial tenglamalarning yechimining xossalari (isboti bilan)
23. Yuqori tartibli o'zgaruvchan koeffitsientli chiziqli differensial tenglamalar. (Umumiy tushuncha va ta'riflar. Koshi masalasi)
24. O'zgaruvchan koeffitsiyentli chiziqli bir jinsli differensial bo'lmagan differensial tenglamalar. Koshi masalasi. Umumiy yechim haqida teorema
25. O'zgaruvchan koeffitsiyentli chiziqli bir jinsli differensial bo'lmagan differensial tenglamalar integrallashning o'zgarimasni variatsiyalash usuli.
26. O'zgarimas koeffitsientli chiziqli bir jinsli differensial tenglama. Xarakteristik son va xarakteristik tenglama.
27. O'zgarimas koeffitsientli chiziqli bir jinsli bo'lmagan differensial tenglama va uning xususiy yechimini topish usullari. (Aniqmas koeffitsientlar usuli)
28. O'zgarimas koeffitsientli chiziqli bir jinsli bo'lmagan differensial tenglama va uning xususiy yechimini topish usullari. (Aniqmas koeffitsientlar usuli)
29. Yuqori tartibli chiziqli differensial tenglamaga keltiriladigan tenglamalar.
30. Eyler tenglamasi va uni yechish usullari.
31. To'la differensial tenglamani yeching: $2xydx + (x^2 - y^2)dy = 0$
32. Bir jinsli tenglamani yeching: $(y^2 - 2xy)dx + x^2dy = 0$
33. Parametr kiritish usuli bilan tenglamani yeching: $y'(x - \ln y) = 1$.
34. To'la differensial tenglamani yeching: $(2 - 9xy^2)xdx + (4y^2 - 6x^3)ydy = 0$

35. Chiziqli tenglamani yeching: $xy' = y - xe^{\frac{y}{x}}$
36. O'zgaras koeffitisentli chiziqli tenglamaning umumiy yechimini toping:
 $y^v - 6y^{IV} + 9y''' = 0$.
37. Tenglamani yeching: $\sqrt{y^2 + 1} dx = xydy$
38. To'la differensial tenglamani yeching: $e^{-y} dx - (2y + xe^{-y}) dy = 0$
39. O'zgaras koeffitisentli chiziqli tenglamaning umumiy yechimini toping:
 $y'' - 4y' + 5y = 0$
40. To'la differensial tenglamani yeching: $\frac{y}{x} dx + (y^3 + \ln x) dy = 0$
41. Parametr kiritish usuli bilan tenglamani yeching: $x = y'^3 + y'$
42. O'zgaras koeffitisentli chiziqli tenglamaning umumiy yechimini toping:
 $y'' + y' - 2y = 0$
43. Koshi masalasini yeching: $(x^2 - 1)y' + 2xy^2 = 0, y(0) = 1$
44. Chiziqli tenglamani yeching: $y' + ytgx = \frac{1}{\cos x}$
45. Klero tenglamasini yeching: $y = xy' - y'^2$
46. Tenglamani yeching: $y(1 + x^2)y' + x(1 + y^2) = 0$
47. Bir jinsli tenglamani yeching: $xy' - y = x \cdot tg\left(\frac{y}{x}\right)$
48. Parametr kiritish usuli bilan tenglamani yeching: $x = y'\sqrt{y'^2 + 1}$
49. Tenglamani yeching: $y' = \sqrt{4x + 2y - 1}$
50. To'la differensial tenglamani yeching: $\frac{3x^2 + y^2}{y^2} dx - \frac{2x^3 + 5y}{y^3} dy = 0$
51. Lagranj tenglamasini yeching: $y + xy' = 4\sqrt{y'}$
52. Umumlashgan bir jinsli tenglamani yeching: $2xy' + (x^2y^4 + 1)y = 0$
53. To'la differensial tenglamani yeching: $(2x^3 + xy^2)dx + (x^2y + 2y^3)dy = 0$
54. Klero tenglamasini yeching: $y'^3 = 3(xy' - y)$
55. To'la differensial tenglamani yeching: $x^2y^3dx + (x^3y^2 - y)dy = 0$
56. Chiziqli tenglamani yeching: $y' - \frac{1}{x}y = x \cos x$
57. Lagranj tenglamasini yeching: $y = 2xy' - 4y'^3$
58. Tenglamani yeching: $\sqrt{y^2 + 1} dx = xydy$
59. Integrallovchi ko'paytuvchini topib, tenglamani integrallang
 $(x^2 + y)dx - xdy = 0, \mu = \varphi(x)$
60. Berilgan tenglamaning barcha yechimlarini toping: $(y' + 1)^3 = 27(x + y)^2$
61. Umumlashgan bir jinsli tenglamani yeching: $2x^2y' = y^3 + xy$
62. To'la differensial tenglamani yeching: $(3x^2 + 6xy^2)dx + (6x^2y + 4y^3)dy = 0$

63. O'zgarmas koeffitisentli chiziqli tenglamaning umumiy yechimini toping:

$$y^V - 6y^{IV} + 9y''' = 0.$$

64. Integrallovchi ko'paytuvchini topib, tenglamani integrallang:

$$(1 - x^2 y)dx + x^2(y - x)dy = 0, \quad \mu = \varphi(x)$$

65. Chiziqli tenglamani yeching: $(2x + 1)y' = 4x + 2y$

66. Klero tenglamasini yeching: $y = xy' - (2 + y')$

67. Koshi masalasini yeching: $(x^2 - 1)y' + 2xy^2 = 0, \quad y(0) = 1$

68. Chiziqli tenglamani yeching: $xy' - 2y = 2x^4$

69. Parametr kiritish usuli bilan tenglamani yeching $y = (y' - 1)e^{y'}$.

70. Integrallovchi ko'paytuvchini topib, tenglamani integrallang:

$$(x^2 + y)dx - xdy = 0, \quad \mu = \varphi(x)$$

71. Bir jinsli tenglamani yeching: $(x - y)dx + (x + y)dy = 0$

72. Parametr kiritish usuli bilan tenglamani yeching $x = y'^3 + y'$

73. Bir jinsli tenglamani yeching: $xy' - y = x \cdot \operatorname{tg}\left(\frac{y}{x}\right)$

74. To'la differensial tenglamani yeching $\frac{y}{x}dx + (y^3 + \ln x)dy = 0$.

75. Lagranj tenglamasini yeching: $2xy' - y = \ln y'$

76. Bir jinsli tenglamani yeching: $y^2 + x^2 y' = xyy'$

77. Chiziqli tenglamani yeching $xy' + (x + 1)y = 3x^2 e^{-x}$.

78. Tenglamani yeching: $xy'' - y' = e^x x^2$

79. Birjinsli tenglamani yeching: $(y^2 - 2xy)dx + x^2 dy = 0$

80. Bernulli tenglamasini yeching: $y' + 2y = y^2 e^x$

81. Parametr kiritish usuli bilan tenglamani yeching $y'(x - \ln y') = 1$.

82. Bir jinsli tenglamani yeching: $(x^2 + y^2)y' = 2xy$

83. To'la differensial tenglamani yeching : $(2 - 9xy^2)xdx + (4y^2 - 6x^3)ydy = 0$

84. O'zgarmas koeffitisentli chiziqli tenglamaning umumiy yechimini toping

$$y^{IV} + 2y'' + y = 0.$$

85. Umumlashgan bir jinsli tenglamani yeching: $x^3(y' - x) = y^2$

86. To'la differensial tenglamani yeching: $\frac{y}{x}dx + (y^2 + \ln x)dy = 0$.

87. Parametr kiritish usuli bilan tenglamani yeching: $y = xy' - \ln y'$

88. Tenglamani yeching: $xydx + (x + 2)dy = 0$

89. Bernulli tenglamasini yeching: $y' + 2y = y^2 e^x$

90. Parametr kiritish usuli bilan tenglamani yeching: $x(y'^2 - 1) = 2y'$

91. Bernulli va o'zgaruvchi almashtirish tenglamalarini yeching:

$$2yy' - x = \frac{x^2 - 1}{y^2}, \quad (u = y^2)$$

92. To'liq differensial tenglamalarni yeching:

$$(2 - 4x^3 - y)dx + (4y^3 - x)dy = 0$$

93. To'liq differensial tenglamalarni yeching: $(y - 1)dx + (x + \cos y)dy = 0$

94. To'liq differensial tenglamalarni yeching: $(y^2 + e^x)dx = (e^y - 2xy)dy$

95. To'liq differensial tenglamalarni yeching:

$$(1 + 2x \ln y)dx + (3y^2 + \frac{x^2}{y})dy = 0$$

96. To'liq differensial tenglamalarni yeching: $(x + \ln y)dy + (y - 2x)dx = 0$

97. Yuqori tartibli chiziqli tenglamalarni yeching: $y'' - 2y' + y = 4e^x$

98. Yuqori tartibli chiziqli tenglamalarni yeching: $y'' + y = 4xe^x$

99. Yuqori tartibli chiziqli tenglamalarni yeching: $y'' + 4y = \sin 2x$

100. Yuqori tartibli chiziqli tenglamalarni yeching: $y^{IV} - 8y' = xe^{2x}$