



2024高等数...

7-1高数础过关~





















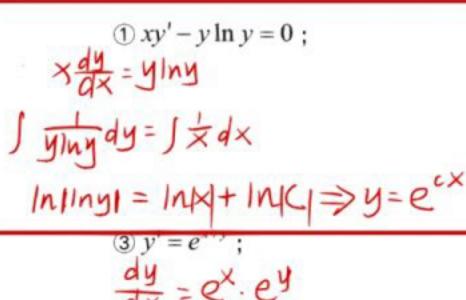




7-3高数基础.



ල ල ७ 27% 🔲 ා



$$3y = e^{x};$$

$$\frac{dy}{dx} = e^{x}.e^{y}$$

$$\int e^{y} dy = \int e^{x} dx$$

$$-e^{-y} = e^{x} + C$$

$$(2) y' - xy' = a(y^{2} + y');$$

$$| 1 - x - a| y' = ay^{2}$$

$$| -x - a| y' = ay^{2}$$

$$| -x - a| = | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x - a| + | -x - a|$$

$$| -x - a| + | -x$$

$$\int -\frac{dx}{e^{-x}+1} = \int +\alpha ny \, dy \quad | \ln \cos y + \ln c = \ln |e^{x}+1|$$

$$-\ln |e^{x}+1| = \ln |\sec y| + \ln |e^{x}+1|$$

$$-\ln |e^{x}+1| = \ln |\sec y| + \ln |e^{x}+1|$$

$$-\ln |e^{x}+1| = \ln |\sec y| + \ln |e^{x}+1|$$

$$-\ln |e^{x}+1| = \ln |\sec y| + \ln |e^{x}+1|$$

$$-\ln |e^{x}+1| = \ln |\sec y| + \ln |e^{x}+1|$$

$$-\ln |e^{x}+1| = \ln |\sec y| + \ln |e^{x}+1|$$

$$-\ln |e^{x}+1| = \ln |\sec y| + \ln |e^{x}+1|$$

$$-\ln |e^{x}+1| = \ln |\sec y| + \ln |e^{x}+1|$$

$$-\ln |e^{x}+1| = \ln |\sec y| + \ln |e^{x}+1|$$

$$-\ln |e^{x}+1| = \ln |e^{x}+1|$$

$$-\ln |e^$$

Jyingdy=Jsinxdx Ininy)=In cotx+csix +In(Iny=cotx+csix => Iny=sinx Iny=cotx+csix => Iny=sinx

$$2xy' = y \ln \frac{y}{x};$$

$$y' = \frac{y}{x} \ln \frac{y}{x}. \quad 2u = \frac{y}{x}$$

$$u'x + u = u \ln u$$

$$\int \frac{du}{u \ln u - 1} = \int \frac{1}{x} dx \Rightarrow \ln y = \ln x + cx + 1$$

 $3y' = \frac{x}{y} + \frac{y}{x}, y(1) = 2;$ $u + u'x = u + \frac{1}{4} \qquad y' = \lambda x' | u | u + 4x'$ $\int u \, du = \int \frac{1}{x} \, dx \qquad y$ $\int u' = |u|x| + C \qquad \frac{x}{x} \qquad \frac{x}{y} \left(1 - \frac{x}{y}\right) dy = 0.$ $\frac{dy}{dx} = \frac{1 + \lambda e^{u}}{-\lambda e^{u}(1 - \frac{1}{4})}$ $\Rightarrow \lambda e^{u}, y + x = C$

 $4(y^{2}-3x^{2})dy + 2xydx = 0, y(0) = 1;$ $Lu^{2}-3)dy + 2u dx = 0$ $Lu^{2}-3)(u+u'x) + 2u = 0$ $\int \frac{3-u^{2}}{u(u^{2}-1)}du = \int \frac{1}{x}dx$ $|n|\frac{u^{2}-1}{u^{3}}| = |nx+cx+|$ $|y^{2}-x^{2}=y^{3}$

3.求下列微分方程的通解或满足所给初始条件的特解:

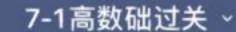
 $y = e \quad \text{[I]} y' + y \cos x = e^{-\sin x};$ $y = e \quad \text{[J]} e^{-\sin x} = e^{-\sin x}$ $= e^{-\sin x}$ $= e^{-\sin x}$ $= e^{-\sin x}$

13一种方街女

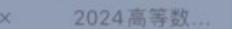
② $(x^2-1)y' + 2xy - \cos x = 0$; $y' + \frac{2x}{x^2-1}y = \frac{\cos x}{x^2-1}$

於解一阶线性微分方程的一般方法:常数变易法,或直接利用以下通解公式 $y = e^{-[\rho(x)dx} \left[\left[q(x) e^{[\rho(x)dx} dx + C \right] \right].$

y= x= (sinx+()







7-1高数础... C。× 7-1高数基础...

7-3高数基础...

7-3高数基础.





























反过来更为便

$$x' + y = y$$

$$x = y$$

y'-tanxy = secx y= etanxdx [|secx etanxdx dx +c] = = = = (itixyo)=0) y= etax [|sinx etax ||sinx etax ||si

(y - 6x) y +24 y.y - bxy +2y =0.

$$4) (y^2 - 6x) \frac{dy}{dx} + 2y = 0;$$

$$x' = 4x - 3y$$

$$x = 4y^2 + cy^3$$

(6) $\frac{dy}{dx} + \frac{y}{x} = \frac{\sin x}{x}, y(\pi) = 1$ y'+ x y = sinx = + [x-1-005x]

①
$$\frac{dy}{dx} = (x+y)^2$$
;

 $2xy' + y = y(\ln x + \ln y).$ クリーXy

可降所的

2y'=P > P'=P+x 'y=∫Pdx P= e | dx [] x e dx + c,] = | c, ex - x - 1) dx = c, ex - x - x + c2

\$ y'=P. y"= alp P

 $y \frac{dP}{dy} P = -2P^{2} \Rightarrow y^{3} = C_{1} \times + C_{2}$ $(5) y'' - ay'^{2} = 0, y(0) = 0, y'(0) = -1;$

 $\frac{dP}{dx} = aP^{2} \qquad | -\frac{1}{P} = ax + C, \Rightarrow c_{1} = 1$ $\int \frac{dP}{dx} = \int a dx \qquad | y = \ln|ax + 1| -\frac{1}{a}$ 6.线性微分方程解的结构:

*P'+P=0 ヨアドロ文 y= CIMIXI+CZ

P'=1+p2 | arctanp = x+ C1 1 = pr dp = 1 dx | y: In | cos(x+c1) |+62

6 $y'' + (y')^2 = 1$, y(0) = y'(0) = 0. $p' + p^2 = 1$ y'' = 1 y'' = 0 y'' =In 1-P 1= X+4

H入路证即 / yi=1xex2.y"=1ex+>x.ex2x 通海: 由于少约丰军、少的少多科人多、少= (1岁)十八少

(2) 已知 $y_1 = x + \cos x$, $y_2 = x + \sin x$, $y_3 = x$ 是二阶非齐次线性微分方程的三个解,

求该微分方程的通解. Ya= y1- Y3= c05× . Yb= y2- y5 =5い A.

shopi y= cicosx + crsinx + x

7-1高数础过关 ~

$\Leftrightarrow \Rightarrow \exists$

高数正式笔记

7-1高数础过关

2024高等数学基础







Q D O























(3) 已知 $y = xe^{-x}$ 是二阶常系数齐次线性微分方程 y'' + py' + qy = 0 的一个特解, 求 p,q. $y' = e^{x} - xe^{-x}$ $y'' = -e^{-x} - (e^{-x} - xe^{-x}) = e^{-x}(x - x)$

HX P=+, 9,=1

7.求下列微分方程的通解或满足所给初始条件的特解:

①
$$y'' - 4y' = 0$$
; ② $y' = P$

$$P' - 4P = 0$$

$$y = C_1 + C_2 e^{4x}$$

$$54y'' + 4y' + y = 0, y(0) = 2, y'(0) = 0;$$

$$4\Gamma^{2} + 4\Gamma + 1 = 0 \Rightarrow \Gamma_{1} = \Gamma_{2} = -\frac{1}{5}$$

$$y = (c_{1} + c_{2} \times z_{1})e^{-\frac{1}{5} \times z_{2}}$$

$$y = (c_{1} + c_{2} \times z_{1})e^{-\frac{1}{5} \times z_{2}}$$

$$\Rightarrow 30334 \cdot y = (2 + x_{1})e^{\frac{1}{5} \times z_{2}}$$

$$2y'' - 4y' + 4y = 0;$$

$$r^{2} - 4r + 4 = 0 \Rightarrow r_{1} = r_{2} = 2$$

$$y = (c_{1} + c_{2} \times) e^{2X}$$

$$x^{(4)} - 2y''' + y'' = 0;$$

$$\int_{-2}^{4} \int_{-2}^{4} \int_{-2}^{4} = 0$$

$$\int_{-2}^{4} \int_{-2}^{4} \int_{-2}^{4} = 0$$

$$\int_{-2}^{4} \int_{-2}^{4} \int_{-2}^{4} = 0$$

$$\int_{-2}^{4} \int_{-2}^{4} \int_{-2}^{4} \int_{-2}^{4} = 0$$

$$\int_{-2}^{4} \int_{-2}^{4} \int_{-2}^$$

1-47+13=0=> 1112=2+31 y= excossx +crsingx1 3 J=exsin3x

1+1-1=0 => L=-1, D== y= c,ex+62e =x+ex

$$\begin{array}{ll}
3y'-2y'+5y-e'\sin 2x, \\
\Gamma^{2}-2\Gamma+5=0. & \Gamma_{1,2}=|\pm 2i| \\
y^{*}=xe^{*}(A\cos 2x+B\sin 2x) \\
\Rightarrow y^{2}=e^{*}(\cos 2x+Cz\sin 2x)-\sqrt{2}xe^{*}\cos 2x
\end{array}$$

「+r=0ラ「1,2) ti YX: Aex + X (A cosx + Bsihx) yz ci cosx+cz sinx+zex+ sxsinx

② $y'' + 3y' + 2y = 3xe^{-x}$; レナタトナンシレニート レコーフ M=61Ex+62Ex+13x-3XVEx

52+4r=0 > T1,2= ±21 MX= (AX+B) cosx + (CX+D) sinx y = CICOSZX + CZSILZX +ZXXXX+QSINX

(6) $y'' - y = 4xe^x$, y(0) = 0, y'(0) = 11=1=0 > 1-1 D=1 1x=x(Ax+B)ex => A=1. b=-1 => y= Ciet Czex + (x2-x)ex => U=1. ()=-1 4=ex-ex+(x2-x)ex