2019302130113 房庭轩

5.  $U_t = a^2 U_{xx}$ 

$$| U|_{t=0} = x(1-x), \ 0 \le x \le 1$$

$$| U|_{x=0} = u|_{x=1} = 0, \ t > 0$$

(2) 
$$ZT' = a^2 Z''T$$

$$\frac{Z''}{Z} = \frac{T'}{a^{\dagger}T} = -\lambda$$

$$\frac{Z''}{Z} = \frac{T'}{\alpha^{2}T} = -\lambda$$

(3) 
$$\begin{cases} 2'' + \lambda^{2} = 0 \\ 2(0) = 0, \ 2(0) = 0 \end{cases}$$

$$|C_1 + C_2 = 0| = |C_1 = C_2 = 0,$$
  $\exists E_1 = C_2 = 0,$ 

$$\lambda 70$$
,  $\lambda = 5^2$ ,  $Z = C_1 \cos 5x + C_2 \sin 5x$ 

$$\lambda = \left(\frac{kT}{L}\right)^2 k = 1, 2, \cdots$$

(5) 
$$U_k = \lambda_k T_k = C_k e^{-a^2 (\frac{kr}{2})^2 t} \sin \frac{kr}{2} x$$

(1) 是成納學以二人(1)

的以知言是在他的对对服务

大前 Ca=+「CXU-X)が発入と

(6) 
$$U(x,t) = \sum_{k=1}^{\infty} C_k e^{-a^2 (\frac{kC}{2})^2 t} \sin \frac{kC}{2} x$$

 $(7) \sum_{n=1}^{\infty} C_k \sin \frac{k\pi}{n} x = x(l-x)$ 

 $450 C_A = \frac{1}{2} \int_0^L x(1-x) \sin \frac{k\pi}{L} x \ dx$  $= \frac{1}{L} \int_{0}^{L} (lx \sin \frac{kx}{L} x - x^{2} \sin \frac{kx}{L} x) dx$ 

 $= \frac{8l^2 - (5)! (1)! (5)! (5)! (5)!}{(2k-1)!^2 \pi^2}, k=1,2,\cdots$ 

(8) 从而 U(x,t)= = 1 81 (24-1)元 e-a1(1)t sin (24-1)元 x

S Clesciation

प्रक्रिक न्यान्य), १६४६।

11/20 =11/12 =0-10

(1) ct = R(N) Tits)

(2) 8T = 0 - 2"T

(3) 18+18=0 (型) 二() 是() 二()

入一の、そこの人では、ココーの一人でし、大

XCO X=-5; BECRESK + CRESK

では、このことに こうにこのこの、 がた

CIEST + CIE-21 =0

A 30, X=1, B=GOSA + GINSA

310円。Ci =0

老山=0, CishIK1=0

太二大元

N= (15) 1-0 12 - 1

の二丁だったが「け」

(平) (水= 新下二年(100mg) (平)

6. 
$$u_t = \alpha^2 u_{xx}$$

$$\int \frac{u|_{t=0} = x}{\frac{\partial u}{\partial x}|_{x=0} = 0}$$

$$\frac{\partial u}{\frac{\partial u}{\partial x}|_{x=1} = 0}$$

(2) 
$$ZT' = a^2 Z'T$$

$$\frac{T'}{a^2T} = \frac{Z''}{Z} = -\lambda$$

$$Z'(\omega) T(t) = 0$$
  $Z'(u) T(t) = 0$   $Z'(\omega) = 0$   $Z'(\omega) = 0$ 

川は、一一、八学的を入り十二

如是=因例的

人二人学的文艺(5)

は=ずしいの学りとれ

 $=\frac{1}{(k_10^4-((-1)^{k-1}-1))}$ 

(3) 
$$z'' + \lambda z = 0$$
  
 $z'(0) = 0, z'(0) = 0$ 

$$\lambda = 0$$
,  $\lambda = C_1 \times tC_2 \Rightarrow C_1 = 0$ , C.自由顶, 这常数 ⇒ T为常数 盆  $\lambda < 0$ ,  $\lambda = -s^2$ ,  $\lambda = C_1 e^{sx} + C_2 e^{-sx}$ 

$$Z = C_1 e^{3\lambda} + C_2 e^{-3\lambda}$$

$$C_1 S + C_2 (-3) = 0$$

$$C_1 S = C_2 (-3) = 0$$

$$C_1 S = C_2 (-3) = 0$$

$$C_1 S = C_2 (-3) = 0$$

$$\lambda >0$$
,  $\lambda = 5^{2}$ ,  $Z = C_{1} \cos 5x + C_{2} \sin 5x$ 

$$2'(0)=0, C_2=0$$

$$\lambda_{k} = (\frac{k\pi}{L})^{2}$$

(4) 
$$T' + a^t \lambda \overline{1} = 0$$
  
 $\overline{1} = C_1 e^{-a^t \lambda t}$ 

(b) 
$$U(x, t) = \sum_{k=1}^{\infty} U_k + \frac{C_k}{2}$$

(7)  $\sum_{k=1}^{\infty} C_k \cos \frac{kx}{t} \times = x$ 

$$C_k = \frac{1}{t} \int_0^t x \cos \frac{kx}{t} \times dx$$

$$= \frac{1}{t} \int_0^t x d\sin \frac{kx}{t} \times \frac{l}{kx}$$

$$= \frac{1}{kx} \left( x \sin \frac{kx}{t} \right) \int_0^t \sin \frac{kx}{t} \times dx$$

$$= \frac{1}{kx} \left( x \sin \frac{kx}{t} \times \frac{l}{kx} \right)$$

$$= \frac{1}{kx} \int_0^t d \cos \frac{kx}{t} \times \frac{l}{kx}$$

$$= \frac{2l}{(kx)^4} (-1)^k - 1$$

$$= -\frac{2l}{(2k-1)^2 x^2}, k=1,2,\cdots$$
(8) With  $U(x,t) = \sum_{k=1}^{\infty} -\frac{4l}{(2k-1)^2 x^2} e^{-x^2 \left(\frac{kx}{t}\right)^2 + 2x} = 0$ 
(9) With  $U(x,t) = \sum_{k=1}^{\infty} -\frac{4l}{(2k-1)^2 x^2} e^{-x^2 \left(\frac{kx}{t}\right)^2 + 2x} = 0$ 
(10)

八十二(學)

かった。 でもから でもなった。 でもな。 でも

IS WE 我从 = CK enter; @於x