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SOME LINEAR PRIVATE DERIVATIVE DIFFERENTIAL TO EQS PLACED INITIAL A MUST AND BORDERLINE OF THE MATTER APPLICATION

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ABSTRACT
Some one linear private derivative differential equations in solving Of course, an integral conditional problem is given , that is own in turn initial a must borderline issue own into takes , the following issue in solving private derivative differential of Eq main in the properties was used

Base Expressions : private derivative, initial a must or private derivative differential to Eq placed Koshi the issue is borderline issue, third in order derivatives, integral conditions .

If (x,t)in the plane$x=0, x=l, t=0$ and be $t=T$the area bounded by straight lines $D=\{(x,t): 0<x<l, 0<t<T\}$.

D is in the field the following the third in order private derivative $U_{xxt}=f(x,t)$(1) equation let's look .

An example . (1) in domain D of Eq determined continuously and the following initial

$u(x,0)=\varphi(x),\ 0<x<l$(1.1) and borderline

$u(0,t)=\mu_1(t), u_x(0,t)=\mu_2(t), 0<t<T$ Find a solution satisfying conditions (1.2) $u(x,t)$.

Solution . Here _ $f(x,t), \varphi(x), \mu_1(t)and\mu_2(t)$ given functions . The following equations $\varphi(0)=\mu_1(0)\ \ \varphi'(0)=\mu_2(0)$(1.3) are suitable for them. Given equation (1). three times consecutively integrated $u(x,t)$finding a solution we can$u_{xxt}(x,t)=f(x,t)$ x variable in the equation according to let's integrate. In this

$\int_0^x u_{rxt}\,dr=\int_0^x f(r,t)\,dr;\ u_{xt}(r,t)|_0^x=\int_0^x f(r,t)\,dr;\ u_{xt}(x,t)-u_{xt}(0,t)=\int_0^x f(r,t)\,dr$

equation have we will be. This in Eq $u_{xt}(0,t)=h(t)$If we define, our equation will look like this:$u_{xt}(x,t)=\int_0^x f(r,t)\,dr+h(t)$

This equation again one times x variable according to if we integrate

$$u_t(x,t)-u_t(0,t)=\int_0^x\left(\int_0^z f(r,t)\,dr\right)dz+xh(t)$$

harvest will $u_t(0,t)=v(t)$be that If we define, Eq the following appearance takes _

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$$u_t(x,t) = \int_0^x \left(\int_0^z f(r,t)\,dr \right) dz + xh(t) + v(t)$$

This equation as follows in appearance writing we can

$$u_t(x,t) = \int_0^x (x-r)\,f(r,t)dr + xh(t) + v(t)$$

Now this the expression t variable according to let's integrate

$$u(x,t) - u(x,0) = \int_0^t \int_0^x (x-r)\,f(x,r)dr\,d\tau + x\int_0^t h(\tau)\,d\tau + \int_0^t v(\tau)\,d\tau$$

this to equality the following designations if we enter

$u(x,0) = g(x),\ \ \int_0^t h(\tau)\,d\tau = f_1(t),\ \int_0^t v(\tau)\,d\tau = f_2(t)$

$u(x,t) = \int_0^t \int_0^x (x-r)\,f(r,\tau)\,drd\tau + xf_1(t) + f_2(t) + g(x)$(2.1)

(2.1) to the solution have we will be. So above of Eq the solution unknown $f_1(t), f_2(t)$ and $g(x)$found depending on the functions.

also given in problem 1 initial and borderline from the conditions used without $f_1(t), f_2(t)$ and $g(x)$we find functions.$u(x,0) = \varphi(x)$ if we apply the initial condition to (2.1), i.e

$$u(x,0) = 0 + x\cdot f_1(0) + f_2(0) + g(x)$$

and above from equality $x\cdot f_1(0) + f_2(0) + g(x) = \varphi(x)$; $g(x) = \varphi(x) - x\cdot f_1(0) - f_2(0)$(2.2) Eq harvest will be. Same so $u(0,t) = 0 + 0\cdot f_1(t) + f_2(t) + g(0)$ to have we will be , from this $f_2(t) + g(0) = \mu_1(t)$; $f_2(t) = \mu_1(t) - g(0)$(2.3) equality harvest will be

$u_x(0,t) = \mu_2(t)$2nd boundary condition to (2.1). apply for from it by x derivative we get need , that is

$$u(x,t) = \int_0^t \int_0^x (x-r)\,f(r,\tau)\,drd\tau + xf_1(t) + f_2(t) + g(x)$$

$$u_x(x,t) = \int_0^t \int_0^x f(r,\tau)\,dr\,d\tau + f_1(t) + g'(x)$$

and above the result we can get from this borderline condition if we use $u_x(0,t) = 0 + f_1(t) + g'(x)$ to have we will be , from this $f_1(t) + g'(0) = \mu_2(t)$; $f_1(t) = \mu_2(t) - g'(0)$. Above found $g(x), f_2(t)$ and $f_1(t)$we put the expressions in the above equations, i.e

$$u(x,t) = \int_0^t \int_0^x (x-r)\,f(r,\tau)\,drd\tau + x\mu_2(t) - xg'(0) + \mu_1(t) - g(0) + \varphi(x) - xf_1(0) - f_2(0)$$

$$= \int_0^t \int_0^x (x-r)\,f(r,\tau)\,drd\tau + x\mu_2(t) + \mu_1(t) - x[f_1(0) + g'(0)] - [f_2(0) + g(0)] + \varphi(x)$$

Above equality simpler become we bring , if $t = 0$it $f_1(0) + g'(0) = \mu_2(0)$, $f_2(0) + g(0) = \mu_1(0)$will be fine. From this equality we get the following result

$$u(x,t) = \int_0^t \int_0^x (x-r)\, f(r,\tau)\, dr d\tau + x\mu_2(t) + \mu_1(t) - x\mu_2(0) - \mu_1(t) + \varphi(x)$$

and above equality more to simplify the matter the solution comes out

$$u(x,t) = \int_0^t \int_0^x (x-r)\, f(r,\tau)\, dr d\tau + x[\mu_2(t) - \mu_2(0)] + [\mu_1(t) - \mu_1(0)] + \varphi(x)$$

Above issue in solving private derivative differential of Eq important from properties , primary and borderline from the conditions was used . Given issue solve through in students private derivative differential equations solve with together , in them practical skills are also formed .

REFERENCES

1. *Salahiddinov M. Integral equations. - Tashkent 2007.*
2. *Vladimir V.S. Equations of mathematical physics - M .”Nauka ”1984 512*
3. *Bitsadtse A.V. Equations of mathematical physics - M. “Nauka ” 1976 296 p.*
4. *Walter A. Strauss “Partial differential equations an introduction” [25-35 pages]*
5. *Victor Ivrii “Partial differential equations an introduction” [22-45- pages]*