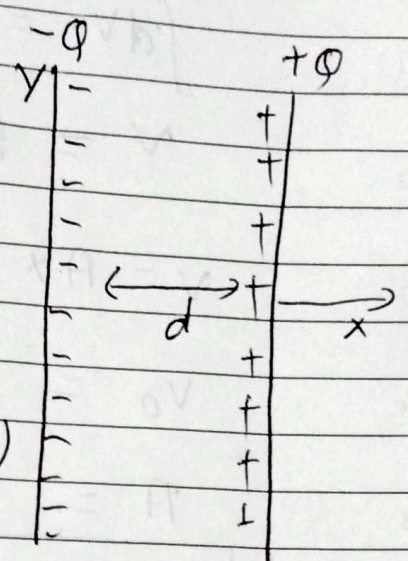


LAPLACE'S EQUATION IN RECTANGULAR CO-ORDINATED

Second order partial difference equation is known as Laplace's equation

Cartesian solution in one dimension (field b/w two parallel plate)



Laplace's equation calculate the potential distribution between the plate.

$V = 0$ at $x = 0$
 $V = V_0$ at $x = d$

No variation in y and z direction and Laplace's equation

$$\frac{\partial^2 V}{\partial x^2} + \frac{\partial^2 V}{\partial y^2} + \frac{\partial^2 V}{\partial z^2} = 0$$

$$\frac{d^2 V}{dx^2} = 0$$

Partial derivative replace by ordinary derivative as V is not function of y and z

$$\frac{d^2 V}{dx^2} = 0 \quad \int \frac{d^2 V}{dx^2} = \int 0$$

JULY 2010			AUGUST						
5	12	19	26	Mon	30	2	9	16	23
6	13	20	27	Tue	31	3	10	17	24
7	14	21	28	Wed		4	11	18	25
8	15	22	29	Thu		5	12	19	26
9	16	23	30	Fri		6	13	20	27
10	17	24	31	Sat		7	14	21	28
11	18	25		Sun		8	15	22	29

$$\frac{dv}{dx} = \text{const.} = A$$

$$\int \frac{dv}{dx} = \int A$$

$$\int dv = \int A dx$$

$$v = Ax + B$$

Boundary condition
 $V = 0 \quad x = 0$
 $V = V_0 \quad x = d$

$$v = Ax \quad B = 0$$

$$V_0 = Ad$$

$$A = \frac{V_0}{d}$$

$$v = \frac{V_0}{d} x \text{ volts}$$

Another boundary condition

$$V_1 = Ad_1 + B \text{ and } V_2 = Ad_2 + B$$

Subtraction

$$V_1 - V_2 = A(d_1 - d_2)$$

$$V = V_1 \quad x = d_1$$

$$V = V_2 \quad x = d_2$$

$$A = \frac{V_1 - V_2}{d_1 - d_2}$$

Sunday 27 Multiply this equation by d_2 and d_1 and sub

$$V_1 d_2 = Ad_1 d_2 + B d_2$$

$$\text{and } V_2 d_1 = Ad_2 d_1 + B d_1$$

$$V_1 d_2 - V_2 d_1 = B(d_2 - d_1)$$

2010		MAY				2010	
Mon	31	3	10	17	24	Mon	7
Tue		4	11	18	25	Tue	8
Wed		5	12	19	26	Wed	9
Thu		6	13	20	27	Thu	10
Fri		7	14	21	28	Fri	11
Sat	1	8	15	22	29	Sat	12
Sun	2	9	16	23	30	Sun	13

$$B = \frac{v_1 d_2 - v_2 d_1}{d_2 - d_1}$$

$$V = \frac{v_1 \cancel{v_2} x + v_1 d_2 - v_2 d_1}{d_1 - d_2}$$

— x —