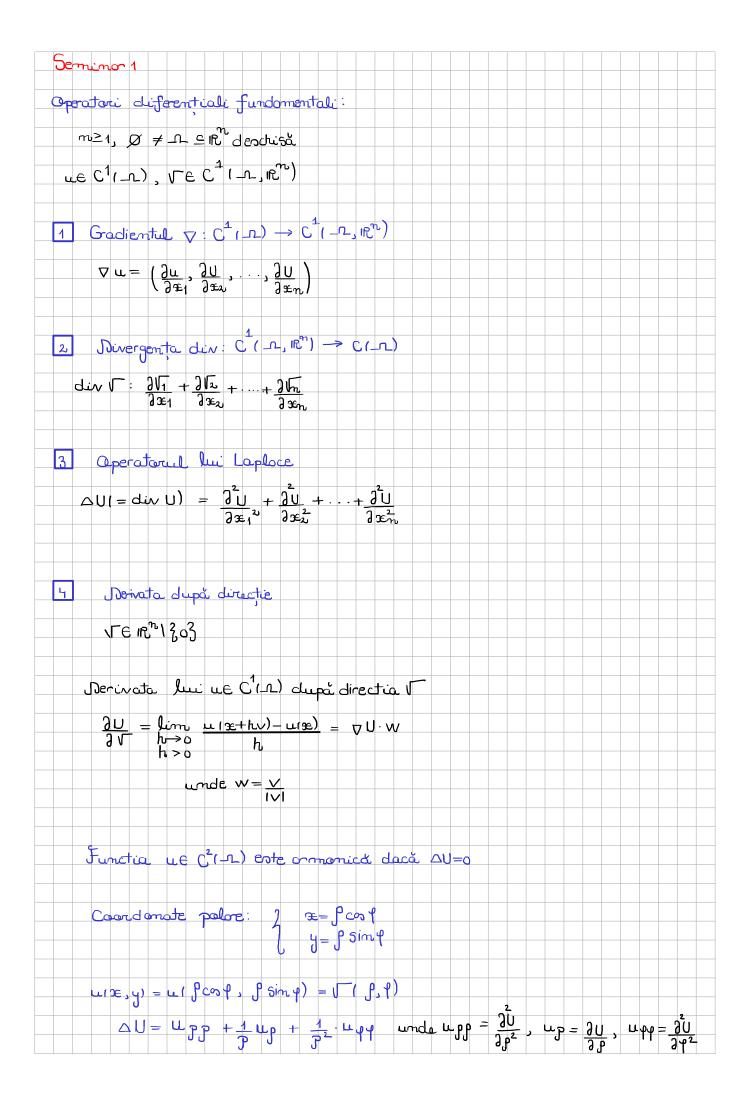
Executive differentialis sections (EDD)  Founties differentialis  Executive and derivate gertials (EDD)  Haratic: $u = u(x_1,, x_n)$ Saw $u = (x_1,, x_n, t)$ Socialis Jimp  Executive de Equatic on Amorate portrals:  11	Cautir ar de vote portiale (FDP)
Example de Ecuatio au derivate portable (EDP)  Hatatie: u = u(x_1,, x_n) Sau u = (x_1,, x_n, t)  Verable timp  Example de Ecuatio au derivate portable:  1) 2u + 3u = 0 Ecuatio bui laplace Badimensională  21) 3u - 3u = 0 Ecuatio (auci u = u(x_1, x_0))  2) 3u - 3u = 0 Ecuatio (auci u = u(x_1, x_0))  3) 3u - (3u + 3u) = 0 Ecuatio Suprafetei vitrante  (aici u = u(x_1, x_0))  4) 3u - 3u = 0 Ecuatio Coldunii unu dimensională  3u 3x = 0 Ecuatio Coldunii unu dimensională  10 3u - 3u = 0 Ecuatio Coldunii unu dimensională  10 3u - 3u = 0 Ecuatio Coldunii unu dimensională  10 3u - 3u = 0 Ecuatio Coldunii unu dimensională  10 3u - 3u = 0 Ecuatio Coldunii unu dimensională  10 3u - 3u = 0 Ecuatio Coldunii unu dimensională  10 3u - 3u = 0 Ecuatio Coldunii unu dimensională  10 3u - 3u = 0 Ecuatio Coldunii unu dimensională  10 3u - 2u = 0 Ecuatio Coldunii unu dimensională  11 3u - 2u = 0 Ecuatio Coldunii  21 3u - 2u = 0 Ecuatio Coldunii  22 3u - 2u = 0 Ecuatio Coldunii  23 3u - 2u = 0 Ecuatio Coldunii  24 5u - 2u = 0 Ecuatio Coldunii  25 3u - 2u = 0 Ecuatio Coldunii  26 3u - 2u = 0 Ecuatio Coldunii  26 3u - 2u = 0 Ecuatio Coldunii  26 3u - 2u = 0 Ecuatio Coldunii	Ecuptie diferentialà ordinarà (EDO)
Exemple de Ecuatic ou derivate perfecte:  1) 3u + 3u = 0 Ecuatic lui laplace Bodinnensimală  2) 3u - 3u = 0 Ecuatic lui laplace Bodinnensimală  2) 3u - 3u = 0 Ecuatic courte; vibrante  (aici u = urs, 1))  3) 3u - (3u + 3u) = 0 Ecuatic suprofete; vibrante  (aici u = urs, 1))  4) 3u - 3u = 0 Ecuatic coldunii uni dimensimală  2t 3x² = 0 Ecuatic coldunii uni dimensimală  2t 3x² = 0 Ecuatic coldunii uni dimensimală  4) 3u - 3u = 0 Ecuatic coldunii uni dimensimală  5) Au - 0 Ecuatic laplace  6) 3u - au = 0 Ecuatic Undeler  7) 3u - au = 0 Ecuatic Coldunii  4) 3u - au = 0 Ecuatic Coldunii  Chi Visate ecuatiile de pină acum sunt linure si anagene cromplu: A este linur adică A( equ - equatic) = 41 aiu) + equatic)	Countre diferentială
Exemple de Ecuatic ou derivate perfecte:  1) 3u + 3u = 0 Ecuatic lui laplace Bodinnensimală  2) 3u - 3u = 0 Ecuatic lui laplace Bodinnensimală  2) 3u - 3u = 0 Ecuatic courte; vibrante  (aici u = urs, 1))  3) 3u - (3u + 3u) = 0 Ecuatic suprofete; vibrante  (aici u = urs, 1))  4) 3u - 3u = 0 Ecuatic coldunii uni dimensimală  2t 3x² = 0 Ecuatic coldunii uni dimensimală  2t 3x² = 0 Ecuatic coldunii uni dimensimală  4) 3u - 3u = 0 Ecuatic coldunii uni dimensimală  5) Au - 0 Ecuatic laplace  6) 3u - au = 0 Ecuatic Undeler  7) 3u - au = 0 Ecuatic Coldunii  4) 3u - au = 0 Ecuatic Coldunii  Chi Visate ecuatiile de pină acum sunt linure si anagene cromplu: A este linur adică A( equ - equatic) = 41 aiu) + equatic)	Notation (contract to the contract to the cont
Exemple de Eustie au triste perfecte:  1) $3\frac{1}{u} + 3\frac{1}{u} = 0$ Eustie lui laplae Bidimensională  21) $3\frac{1}{u} - 3\frac{1}{u} = 0$ Eustie caordei vibronte  21) $3\frac{1}{u} - 3\frac{1}{u} = 0$ Eustie caordei vibronte  (cici u = urs, 1))  3) $3\frac{1}{u} - \left(\frac{3u}{3x^2} + \frac{3u}{3x^2}\right) = 0$ Eustie suprofete vibronte  (aici u = urs, 1))  4) $3u - 3\frac{1}{u} = 0$ Eustie căldurii uni-dimensională  1) $3\frac{1}{u} - 3\frac{1}{u} = 0$ Eustie căldurii uni-dimensională  1) $3\frac{1}{u} - 3\frac{1}{u} = 0$ Eustie căldurii uni-dimensională  1) $3\frac{1}{u} - 3\frac{1}{u} = 0$ Eustie căldurii uni-dimensională  1) $3\frac{1}{u} - 3\frac{1}{u} = 0$ Eustie laplacionul funcției u unde $u = urs_1,, s_n$ 5) $au = (s_1,, s_n, t)$ 5) $au = 0$ Eustie laplace  6) $au = (s_1,, s_n, t)$ 7) $au = 0$ Eustie laplace  6) $au = 0$ Eustie laplace  6) $au = 0$ Eustie laplace  7) $au = 0$ Eustie laplace  8) $au = 0$ Eustie laplace  9) $au = 0$ Eustie laplace  1) $au = 0$ Eustie laplace  1) $au = 0$ Eustie caratie căldurii  1) $au = 0$ Eustie eustie de pând acum sunt linure si amagene  1) $au = 0$ Example de pând acum sunt linure si amagene  1) $au = 0$ Example de pând acum sunt linure si amagene  1) $au = 0$ Example de pând acum sunt linure si amagene	yorabile timp
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(aici u=us,t))  3) $\frac{\partial u}{\partial x} - \left(\frac{\partial u}{\partial x_1} + \frac{\partial u}{\partial x_2}\right) = 0$ Ecuatio Suprofete vibrante (aici u=ure,sut))  4) $\frac{\partial u}{\partial x_1} - \frac{\partial u}{\partial x_2} = 0$ Ecuatio Addurii uni-dimensianală  1totani: $\Delta u = \frac{\partial u}{\partial x_1} + \dots + \frac{\partial u}{\partial x_N}$ Laplacianul functiei u  unde u=ure,,sm)  50 $\Delta u = 0$ Ecuatio Laplace  6) $\frac{\partial u}{\partial x} - \Delta U = 0$ Ecuatio Undelor  3t $\frac{\partial u}{\partial x} - \Delta U = 0$ Ecuatio Undelor  7) $\frac{\partial u}{\partial x} - \Delta U = 0$ Ecuatio Undelor  6) $\frac{\partial u}{\partial x} - \Delta U = 0$ Ecuatio Undelor  6) $\frac{\partial u}{\partial x} - \Delta U = 0$ Ecuatio Undelor  7) $\frac{\partial u}{\partial x} - \Delta U = 0$ Ecuatio Undelor  8) $\frac{\partial u}{\partial x} - \Delta U = 0$ Ecuatio Undelor  9) $\frac{\partial u}{\partial x} - \Delta U = 0$ Ecuatio Undelor  10) $\frac{\partial u}{\partial x} - \Delta U = 0$ Ecuatio Undelor  11) $\frac{\partial u}{\partial x} - \Delta U = 0$ Ecuatio Undelor  12) $\frac{\partial u}{\partial x} - \Delta U = 0$ Ecuatio Undelor  13) $\frac{\partial u}{\partial x} - \Delta U = 0$ Ecuatio Undelor  14) $\frac{\partial u}{\partial x} - \Delta U = 0$ Ecuatio Undelor  15) $\frac{\partial u}{\partial x} - \Delta U = 0$ Ecuatio Undelor  16) $\frac{\partial u}{\partial x} - \frac{\partial u}{\partial x$	g(x) = g(x) +
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Hotom: $\Delta u = 3\frac{u}{2} + + \frac{3u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{3}\frac{u}{$	
unde u= u(x1,,xm)  50 μ u= (x1,,xm)  51 Δu=0 Ecuatia Laploce  6) 3²u - ΔU = 0 Ecuatia Undelor  3t²  7) 3U - ΔU = 0 Ecuatia Coldurii  3t  Obs: Voate ecuatiile de pând acum sunt linuae si amagene  exemplu: Δeste linua adică Δ(ζημ + ζημ) = ζηΔ(μ) + ζηΔ(μ)	It Jæ3 , cantia coldurar ani-dimensionala
unde u= u1æ1,,æm)  50u u= (æ1,,æm,t)  5) Δu=0 Ecuatia Laploce  6) 3²u - ΔU = 0 Ecuatia Undelor  3t²  7) 3U - ΔU = 0 Ecuatia Coldurii  3t  Obs: Voate ecuatiile de pând acum sunt linuae și amagene exemplu: Δeste linua adică Δ( ∠1 u1 + ∠2 u2) = ∠1 Δ(u1) + ∠2 Δ(u2)	
50 Δu=0 Ecuatia laploce  6) 3 <sup>2</sup> u - Δu = 0 Ecuatia Undelor  7) 3U - Δu = 0 Ecuatia coldurii  1) the limin adică Δ( ζιμι + ζιμι) = ζιΔ(μι) + ζιΔ(μι)  exemplu: Δeste limin adică Δ( ζιμι + ζιμι) = ζιΔ(μι) + ζιΔ(μι)	Hatom: $\Delta u = \frac{3^2u}{3x_1^2} + \dots + \frac{3^2u}{3x_m^2}$ Laplacional function
5) Δu=0 Ecuatia Laploce  6) 3²u - ΔU = 0 Ecuatia Undelor  7) 3U - ΔU = 0 Ecuatia coldunic  Obs: Joste ecuatiile de pând acum sunt liniore si amagene  exemplu: Δ este linior adică. Δ( Ειμι + Ειμι) = ΕΙΔ(μι) + Ει Δ(μι)	
G) 3 <sup>2</sup> u - ΔU = 0 Ecuatia Undelor  7) 3U - ΔU = 0 Ecuatia coldunic  Obs: Jate ecuatiile de pôna acum sunt limine si amagene exemplu: Δ este limin adica Δ( κι ωι + κι ωι) = κι Διωι) + κι Διων)	σου u= (æ1,,æn,±)
3U - ΔU = 0 Ecuatia coldunia  Obs: Joate ecuatiale de pând acum sunt linione si amagene  exemplu: Δ este linion adică Δ( Ειμι + Ενμν) = ΕιΔ(μι) + ΕνΔ(μν)	5) Du=0 Ecuatia Laploce
3U - ΔU = 0 Ecuatia coldunia  Obs: Joate ecuatiale de pând acum sunt linione si amagene  exemplu: Δ este linion adică Δ( Ειμι + Ενμν) = ΕιΔ(μι) + ΕνΔ(μν)	6) 3 <sup>2</sup> u - DU = 0 Ecuatia Undelar
Obs: Joate ecuaticle de pônd acum sunt limine si amagene exemplu: Δ este limin adica Δ( ζι μι + κρ μρ) = κι Δ(μι) + κρ Δ(μρ)	
exemplu: Δ este limin adica Δ( ει μι + εν μν) = ει Δ(μι) + εν Δ(μν)	
$ \cdot \cdot \cdot \wedge  \cdot  \rightarrow \Psi \rightarrow \Sigma_{U}$ of the $ \cdot $ for seach $ \cdot \cdot$	$\Delta U = 4 - \epsilon_{\text{custice}}  Poisson$

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produced scalar (f.g)  $L_{2} = \int_{-\pi}^{\pi} f(x) \cdot g(x) dx$ ,  $\forall f, g \in L^{2}(-\pi, \pi)$ 

```
4) Fie ment. Vann aröta că ? 1, contre, sinke: 1 < k < m3 sunt liniar independente
     P.p. abourd ca sunt linear dependente = ) I bo, bk, ak nu tati nuli a.i
   a. \overline{1} by + \sum_{k=1}^{\infty} (b_k \cos kx + a_k \sin kx) = 0
      Întegron de la - Je la Ju
          \int_{-\pi}^{\pi} b_0 dx + \sum_{k=1}^{\pi} (b_k \cdot \int_{-\pi}^{\cos kx} dx + a_k \cdot \int_{-\pi}^{\sin kx} dx) = 0
        = 2000 + 60 = 0
          deci \sum_{k=1}^{\infty} (b_k c_0 k_2 + a_k sink_2) = 0 | core si integron
          => b1 = 0 si tot asa pôno cônd abtinom b0 = b1 = ... = bn = a1 = .. = an = 0
                => limio independente
 Jefinitie: Fie 7:1R→1R, T(x)=bo+ 5 (bk cookse + ak sinkse) unde me 1H*
 Spunem ca t'este un palinom trigonometric de grodul m ior be au sunt caeficientii lui.
  Obs: Un polinomo trigonometric este a funcție voi-periodică
  Definiție: fie g: 12 > 12 a funcție experiodică a 7 g (- 12, 12).
    Fix b_0 = \frac{1}{2\pi L} \int_{-\pi_L}^{\pi_L} q(\gamma) d\gamma
b_{K} = \frac{1}{\pi L} \int_{-\pi_L}^{\pi_L} q(\gamma) c_{2K} \gamma d\gamma
c_{K} = \frac{1}{\pi L} \int_{-\pi_L}^{\pi_L} q(\gamma) s_{ink} \gamma d\gamma
c_{K} = \frac{1}{\pi L} \int_{-\pi_L}^{\pi_L} q(\gamma) s_{ink} \gamma d\gamma
   50 = 60 + 5 (6k coke + ansinke)
Spuram cà Sq este reria Faurier a lui g dupà sistemul (1), ier a pes be sunt coef. rerii Faurier ai Viui g.
```



turcție readială: u: IR² -> IR	
	_
$\mu(x,y) = \psi(y), p = \sqrt{x^2 + y^2}$	
$X = \begin{pmatrix} \mathfrak{T} \\ \mathfrak{T} \end{pmatrix}$ , $ X  = \sqrt{X^2 + y^2}$	
Exercitive 1: u: IR3 -> IR, u(w) = (w)	
a) VU, div(VU), AU	
	_
C) u omonica Tu 123	
d) verocrub val directie (1,1,1)	
	_
e) 3~	
Solutive: a) $u = (x, y, z) \in \mathbb{R}^3$	-
$u(u) = (\sqrt{x^2 + v^2 + z^2})^2 = x^2 + y^2 + z^2$	
	_
$\frac{\partial \mathcal{L}}{\partial v} = v \mathcal{L}$	$\dashv$
$\frac{\partial U}{\partial y} = \lambda y$ = $(\lambda x, \lambda y, \lambda z) \rightarrow \text{gradientul}$	-
$\frac{\partial U}{\partial z} = \lambda z$	_
0 %	-
$div(\nabla U) = \Delta U = \frac{\partial U}{\partial x^2} + \frac{\partial \overline{U}}{\partial y^2} + \frac{\partial^2 U}{\partial \overline{z}^2} = x + z + x = 6$	
b) UE C1 (183) (derivatele portiale de ardinul I sunt functio continue)	
L) DU = G≠0 => Unu ente ormanică	_
7-7-7-7-7-7-7-7-7-7-7-7-7-7-7-7-7-7-7-	
	_
d) v= (1,1,1) =>  v  = \( \lambda + 1 + 1 \) = \( \bar{3} \)	-
$=> W = \frac{V}{ V } = \left(\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}\right)$	
101 03 03 /	
e) 10 = VV·W = 2 = + 2 4 + 2 =	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	
	_
	$\dashv$

Exercitive 3			
U: 12 \ 203 → 12			
uæ) = lm æ			
2) L € C(IR²)			
b) VU, AU			
C) U- o monica 7 n 12 13	03?		
$d)  \vee = \left(\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right), \frac{3U}{3V}$			
Salutie:			
a) u(x) = ln(x) = ln	$\left(\sqrt{\frac{2}{2}} + \frac{2}{2}\right) = \frac{1}{2} \ln$	(\$2+\$2) definits si	continuo pe 12 ( x 2+ x2 >)
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	<u>364</u>		
	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$= \left(\frac{3x_1}{3u}, \frac{3x_2}{3u}\right) = \left(\frac{x_1}{x_1^2} + \frac{x_2}{x_1^2}\right)$	
omolog $\frac{\partial U}{\partial x_{\nu}} = \frac{x_{\nu}}{x_{\nu}^{2} + x_{\nu}^{2}}$		(±1)	9 2 2 1 + 9 2 J
c) $\frac{\partial U}{\partial x_1^2} = \frac{x_1^2 + x_2^2 - \lambda x_1^2}{(x_1^2 + x_2)^2} =$	$\frac{x_{2}^{2}-x_{1}^{2}}{(x_{1}^{2}+x_{2}^{2})^{2}}$		
onalog $\frac{3^2 U}{3x_2^2} = \frac{x_1^2 - x_2^2}{(x_1^2 + x_2^2)^2}$			
$\Delta U = \frac{\partial^2 U}{\partial x_1^2} + \frac{\partial^2 U}{\partial x_2^2} = \frac{x_2^2}{(1 + \frac{\partial^2 U}{\partial x_2^2})^2}$	$\frac{x_{1}^{2} + x_{1}^{2} - x_{2}^{2}}{(x_{1}^{2} + x_{2}^{2})^{2}} = 0$	=> U este omanica	L L
d) $V = (1, 1)$			
$d)  V = \left(\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$		,	
$ V  = \sqrt{\left(\frac{1}{\sqrt{2}}\right)^2 + \left(\frac{1}{\sqrt{2}}\right)^2} = \frac{1}{\sqrt{2}}$	=> W = V = V		
$\frac{\partial U}{\partial V} = \nabla U \cdot W = \frac{1}{\sqrt{2}} \cdot \frac{\mathfrak{X}_1}{\mathfrak{X}_1^2 + 1}$	1 32		
dV	£1		

Exercituly.							
Gasiti Ue C	²(IL²), (3⊆	,±) → u	டாதேர்) டி.ர				
a) u <sub>36</sub> =	o, 6) u.t	ge_ = O ,	د) س <sub>عج</sub> = د	(tema)			
Salutie:							
a) w(æ, t)	= ∫u <sub>æ</sub>	æ,t)dæ	$=\int o dx$	= gut) ,	g∈ C <sup>2</sup> (R)		
b) wtx = 3	]²u = <u>`</u> ]t7æ = <u>`</u>	$\frac{x}{3} \left( \frac{9T}{3n} \right) =$	= 0 => 3	1 <u>1                                  </u>	t)∈C <sup>1</sup>		
Fie Gapi	mitivä	م ليين G	a.î Gid	) = 9(土)			
=> U(t) =	l ditjan	$z = G(\pm)$	+92(æ)				
c) u <sub>ææ</sub> =	2 = 3 ± 2	3 (3 m)	) = 0 =)	300 = g	(±) ∈ C <sup>1</sup>		
=> U =	e (tt) e	= + 921t	)				
Exercitud 5							
Jet Ac	. C <sup>2</sup> (IR) cu	A(0) = 0	a.ī U(æ,	t) = A(x)	e Loe na	natisfaci ecuaț	ia
Coldurii In 12°							
Soluție:							
المرابع عن المرابع الم	اطسين :	3T 3x,	) = 0 (=)	ut-urx	= 0 (1)		
nt = 3n =	. − 9 A <sub>1≆</sub> )	te-9t					
$ u_{xx} = \frac{9x}{90} $	= A"( <b>æ</b> )·∈	Le - 9 L					
Inlacuind in	7 (1) abtic	nenn : - ;	ე A (≆) · e <sup>—</sup> 9	t - A"(£)	e 9t = 0		
		_ e <sup>9</sup>	ıt(A"(œ) -	+ 9 A(£) =	o => A"(36)	+9A(x) = 0	
din Ecuatia	coacter	istică n².	+9=0=	s π = ± 3	Ţ.		
=> A(%) =	F1 5im 3 æ	+ 122003)	x				

 $A(0) = 0 \Rightarrow L_{\upsilon} = 0 \Rightarrow A(\mathfrak{X}) = L_{1} \text{ Sim} X, L_{1} \in \mathbb{R}$ 

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Exercitive 6 ( Jema)
            Jeterminati A € C'(1R) a î U125,y) = € A (y) 50 fie ornanică în R
         Salutie:
         U omorica (=) \frac{2U}{3x^2} + \frac{2U}{3y^2} = 0
\frac{2U}{3x} = xe^{2x}A(y), \frac{2U}{3x^2} = 4e^{2x}A(y)
= 4e^{2x}A(y) + e^{2x}A(y) = 0
               \frac{\partial U}{\partial y} = e^{2 \frac{2 \frac{2}{3}}{3}} + \frac{\partial U}{\partial y^2} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}{\partial y^3} + \frac{\partial U}{\partial y^3} = e^{2 \frac{2}{3}} + \frac{\partial U}
                                                                                                                                                                              din ecuation construct r2+4=0=> r=+2i
                                      => A(4) = C1 Sim2y + C2C32y cu C1, C2 EIR
   Exercitical + Folosind coordonatele palore determinati rolutia rodialà
In 1821203 pentru ecuatia lui laplace pentru:
                                        a) \Delta U = 0
                                      6) DU = 4
                                         C) \Delta U = x^2 + y^2
           Salutio:
           \bigcup (\beta, \gamma) = f(\beta) \quad \text{si} \quad \beta = \sqrt{3\epsilon^2 + \gamma^2}
             \Delta U = \mu p + \frac{1}{P} f(p)
function
depinds
      a) AU = 0
                    f''(p) + \frac{1}{p}f'(p) = 0 \cdot \frac{1}{f'(p)}
             f(p) = -\frac{1}{p} | \int = 2 \ln f(p) = -\ln p + \mathcal{L}_1
f(p) = e \ln \frac{1}{p} + c_1 = c_1
f(p) = e \cdot \frac{1}{p} = c_2 \cdot \frac{1}{p} | \int
```

=) f(p) = Lulup+cz cu c1,c2,cze11e

b) AU = 4	
$f''(p) + \frac{1}{p} f'(p) = 4 p$	
pf'(p) + f(p) = 4p	
777777777	
(f(p)·p) = 4p   S	
,	
$f(p) \cdot p = 2p^2 + C_1$	
$f'(p) = 2p + \kappa_1 \int$	
P	
$f(p) = p^2 + c_1 lmp + c_2 cuc_1, c_2 \in \mathbb{R}$	
0,17/ 1 -1 2.01/ 1-2 03 01,02 010	
2 2 2	
$\triangle U = \mathscr{Z} + \mathscr{Y} = \mathscr{D}^{2}$	
0,30,00,00,00	
$f''(p) + \frac{1}{p} f'(p) = p^{2}   p$	
$p \cdot f''(p) + f'(p) = p^3$	
) ) ,	
$(p \cdot f(p)) = \rho^3   \int$	
$p \cdot f(p) = \frac{p}{4} + c_1 \cdot \frac{1}{p}$	
$p \cdot T(p) = p + c_1 \cdot \frac{1}{p}$	
$f'(p) = \frac{p^3}{4} + \frac{p}{p} \int$	
J F J J	
$f(p) = \frac{p^4}{16} + c_1 lmp + c_2 cu c_1, c_2 \in \mathbb{R}$	
16	

Executives						
Det. valorile pro	pric si fun	ح ماننې	opi ale	prableme:	Dirichlet	pentru ecuatio
Laploce Tm _12 = 10	,a) =  R					
Solutie:						
Φ: <u>Λ</u> →R 5.m	functie P	ъргие ра	entru pb	Dinichlet o	Lui Lapla	oce mr. docă:
• Ø € C²(L)	, ,				,	
• <b>♦</b> Ø						
1.0 AIBS E.	$-\Delta \phi = \lambda$		n_			
valare prapri						
În IR ecuația - 2		devime				
— ф" =	= 2 <b>0</b>					
$\Phi'' + \lambda \Phi =$	0					
Adaugsm condi	țiile la lir	nuta Φι	$o) = \Phi(a)$	)=0		
Φ"(%) + λ	$\Phi(\mathfrak{X}) = 0$					
Cazul 1) dacă ?	l <0 => ∃	h > 0	a.ī 2=-	2		
φ"(×) –	μ <sup>2</sup> Φ(x) =0					
=> \Psi x \rangle =	= L1 .e 1 3 -	+ c2, e - r	æ			
Φ (0)	= 0 = 2 C <sub>1</sub> +	C 20 = 0				
<b>Φ</b> (α)	=0 => C, e	-μα + C <sub>2</sub>	= 0			
Carule) $\lambda = 0$	onalag					
Cozul 3) 2 > 0	U					