1

U = 3 – 8x + 6y x2 + y2 = 36

F(x, y) = 3 – 8x + 6y + λ(x2 + y2 – 36)

⎧-8 + 2λx = 0

⎨6 + 2λy = 0

⎩x2 + y2 – 36 = 0

⎧x = 8/2λ = 4/λ

⎨y = -6/2λ = -3/λ

⎩x2 + y2 – 36 = 0

(4/λ)2 + (-3/λ)2 – 36 = 0

16/λ2 + 9/λ2 = 36

λ2 = 25/36

λ = 5/6 λ = -5/6

x = 24/5 x = -24/5

y = -18/5 y = 18/5

2

U = 2x2 + 12xy + 32y2 + 15 x2 + 16y2 = 64

F(x, y) = 2x2 + 12xy + 32y2 + 15 + λ(x2 + 16y2 - 64)

⎧4x + 12y + 2λx = 0

⎨12x + 64y + 32λy = 0

⎩ x2 + 16y2 – 64 = 0

⎧2x + 6y + λx = 0

⎨3x + 16y + 8λy = 0

⎩x2 + 16y2 – 64 = 0

⎧6y = -2x - λx

⎨3x = -16y - 8λy

⎩x2 + 16y2 – 64 = 0

⎧y = (-2x - λx)/6

⎨x = (-16y - 8λy)/3

⎩x2 + 16y2 – 64 = 0

((-16y – 8λy)/3)2 + 16 \* ((-2x - λx)/6)2 – 64 = 0

⎧⎪⎨⎪⎩

3.

U = x2 + y2 + z2 вектор c(-9, 8, -12) точка M(8, -12, 9)

U’/x = 2x U’/x(M) = 16

U’/y = 2y U’/y(M) = -24

U’/z = 2z U’/z(M) = 18

|c| = √((-9)2 + (8)2 + (-12)2) = √289 = 17

c0 = (-9/17, 8/17, -12/17)

cos α = -9/17 cos β = 8/17 cos γ = -12/17

U’/c(M) = 16\*(-9/17) + (-24)\*(8/17) + 18\*(-12/17) = (-144 – 192 – 216)/17 =

-552/17

4.

U = ex^2+y^2+z^2 вектор d(4, -13, -16) точка L(-16, 4, -13)

U’/x = ex^2+y^2+z^2 2x U’/x(L) = -32\*e441

U’/y = ex^2+y^2+z^2 \*2y U’/y(L) = 8\*e441

U’/z = ex^2+y^2+z^2 \*2z U’/z(L) = -26\*e441

|d| = √((4)2 + (-13)2 + (-16)2) = √441 = 21

d0 = (4/21, -13/21, -16/21)

cos α = 4/21 cos β = -13/21 cos γ = -16/21

U’/d(L) = (-32\*e441) \* (4/21) + (8\*e441) \* (-13/21) + (-26\*e441) \* (-16/21) =

= (e441) \* ((-128 – 104 + 416)/21) = (e441) \* (184/21)