Задание 1.1

Осипенко Д. 595гр.

14 апреля 2020 г.

3540

$$x^2 + y^2 + z^2 - 169 = 0, \quad M_0(3, 4, 12)$$

$$F'_x = (x^2 + y^2 + z^2 - 169)'_x = 2x \quad F(M_0)'_x = 6$$
$$F'_y = (x^2 + y^2 + z^2 - 169)'_y = 2y \quad F(M_0)'_y = 8$$
$$F'_z = (x^2 + y^2 + z^2 - 169)'_z = 2z \quad F(M_0)'_z = 24$$

$$F(M_0)'_x(x - x_0) + F(M_0)'_y(y - y_0) + F(M_0)'_z(z - z_0) = 0$$

$$6(x - 3) + 8(y - 4) + 24(z - 12) = 0; \quad \underline{3x + 4y + 12z - 169 = 0}$$

$$\underline{\frac{x-3}{6} = \frac{y-4}{8} = \frac{z-12}{24}}$$

3621

$$z = x^2 + (y - 1)^2$$

$$F'_x = 2x \quad F'_y = 2(y - 1)$$
$$x = 0 \quad y = 1$$

$M_0(0; 1)$ - стационарная точка

$$A = F''_{xx} = 2 \quad B = F''_{xy} = 0 \quad C = F''_{yy} = 2$$

$$AC - B^2 = 4 > 0; \quad A > 0$$

Есть экстремум, и это минимум

$$\underline{F(M_0) = 0 = z_{min}}$$

3385

$$x + y + z = e^z$$

$$dx + dy + dz = e^z dz \quad dz = \frac{(dx + dy)}{e^z - 1} = \frac{(dx + dy)}{x + y + z - 1}$$

$$z'_x = z'_y = \frac{1}{x + y + z - 1}$$

$$d^z = e^z dz^2 + e^z dz^2 \quad d^2 z = -\frac{e^z}{e^z - 1}(dx^2 + 2dxdy + dy^2)$$

$$\underline{z''_{xx} = z''_{xy} = z''_{yy} = -\frac{x + y + z}{(x + y + z - 1)^3}}$$