

5.2A

6. (2) 当 $x+y=0$ 时, $f(x, y)$ 不存在 \therefore 不连续.

(3) 设 $x=r\cos\theta$, $y=r\sin\theta$ 当 $x^2+y^2 \neq 0$ 时,

$$f(x, y) = \frac{r^2 \cos\theta \sin\theta}{|r|} = |r| \cos\theta \sin\theta = g(r)$$

$$\therefore \lim_{(x, y) \rightarrow (0, 0)} f(x, y) = \lim_{r \rightarrow 0} g(r) = 0 = f(0, 0) \therefore \text{连续}$$

8. 设 $x=t\cos\theta$, $y=t\sin\theta$

$$f(x, y) = \frac{t^3 \cos^2\theta \sin\theta}{t^4 \cos^4\theta + t^2 \sin^2\theta} \div \lim_{t \rightarrow 0} f(t\cos\theta, t\sin\theta) = 0 = f(0, 0)$$

当 $y=x^2$ 时, $f(x, y) = \frac{1}{2} \neq f(0, 0) \neq \frac{1}{2} \therefore f(x, y)$ 在 $(0, 0)$ 不连续.

5.3A

$$1. (3) \quad \frac{\partial z}{\partial x} = \frac{1}{1+x^2-2xy^2+y^4}$$

$$\frac{\partial z}{\partial y} = \frac{1}{1+x^2-2xy^2+y^4} \cdot -2y = -\frac{2y}{1+x^2-2xy^2+y^4}$$

$$2. (1) \quad f_x(x, y) = 1 + \frac{y-1}{2\sqrt{y-x^2}} \div f_x(x, 1) = 1$$