5/17 微積 II.

例： $f(x,y) = x\cos(3x-2y)$ について $f_{xy} = f_{yx}$ を示せ.

$f_x = \cos(3x-2y) + (-3)x\sin(3x-2y)$

$f_y = 2x\sin(3x-2y)$

$f_{xy} = 2\sin(3x-2y) + 6x\cos(3x-2y)$

$f_{yx} = 2\sin(3x-2y) + 6x\cos(3x-2y)$ $\quad \therefore f_{xy} = f_{yx}$

あれば求めよ：

問(1) $z = x\cos y$ の $(x_0, y_0) = (2, \pi)$ における接平面.

$z_x = \cos y \quad \therefore z_x(2,\pi) = -1$

$z_y = -x\sin y \quad \therefore z_y(2,\pi) = -2\sin\pi = 0$.

$z(2,\pi) = 2\cos\pi = -2$

$\therefore$ 接平面は $g(x,y) = -(x-2) - 2 = \underline{-x}$

(2) $f(x,y) = \begin{cases} \dfrac{xy}{x^2+y^2}, & (x,y) \neq (0,0) \\ 0, & (x,y) = (0,0) \end{cases}$

$f_x(0,0) = \lim_{h \to 0} \dfrac{f(h,0) - f(0,0)}{h} = 0$

$f_y(0,0) = \lim_{k \to 0} \dfrac{f(0,k) - f(0,0)}{k} = 0$

$f(0,0) = 0$

よって, 接平面は

$g(x,y) = \underline{0}$.