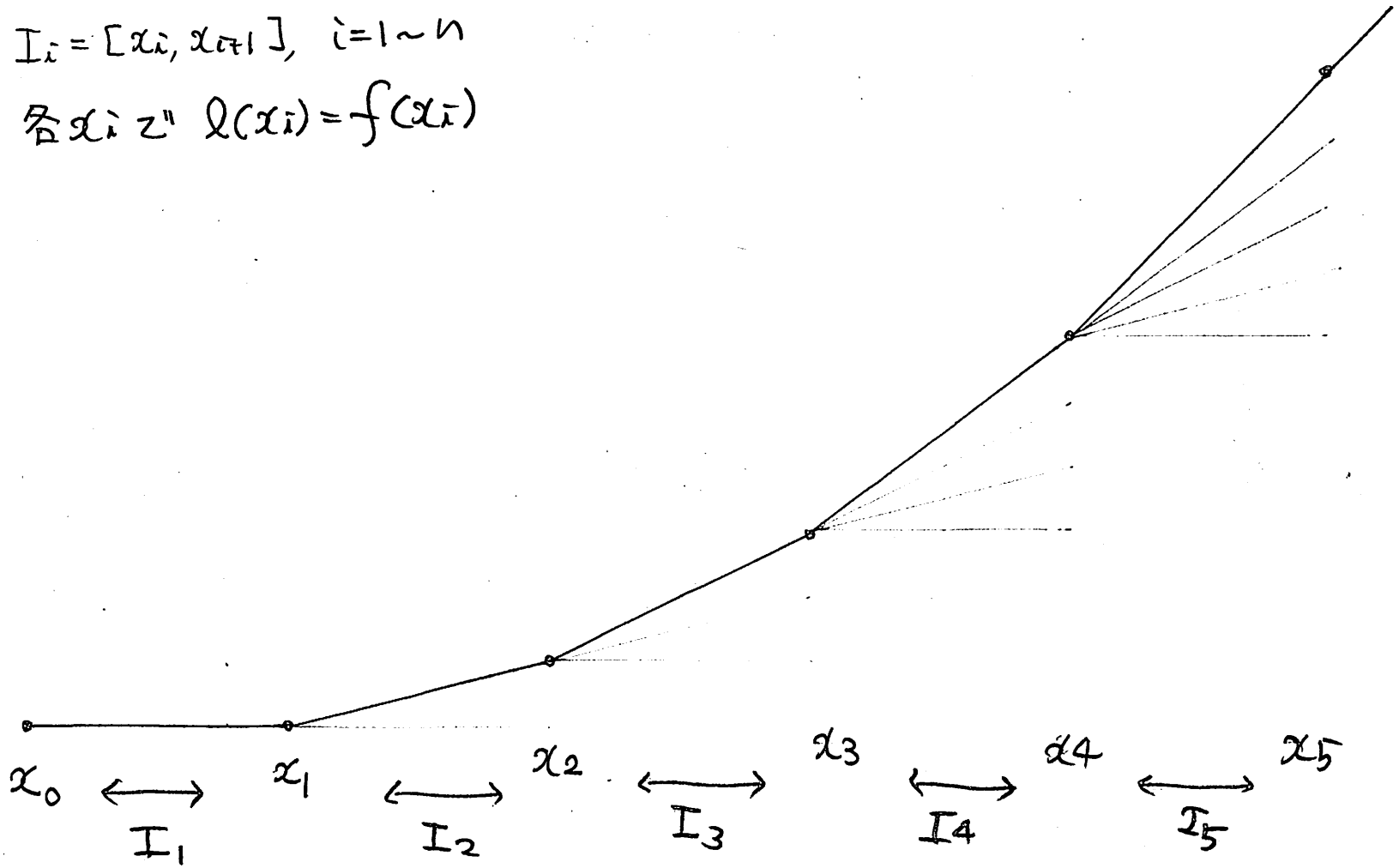
$y=f(x)$ の折れ線グラフ (近似) $\ell(x)$

$I_i=[x_i, x_{i+1}]$, $i=1\sim n$

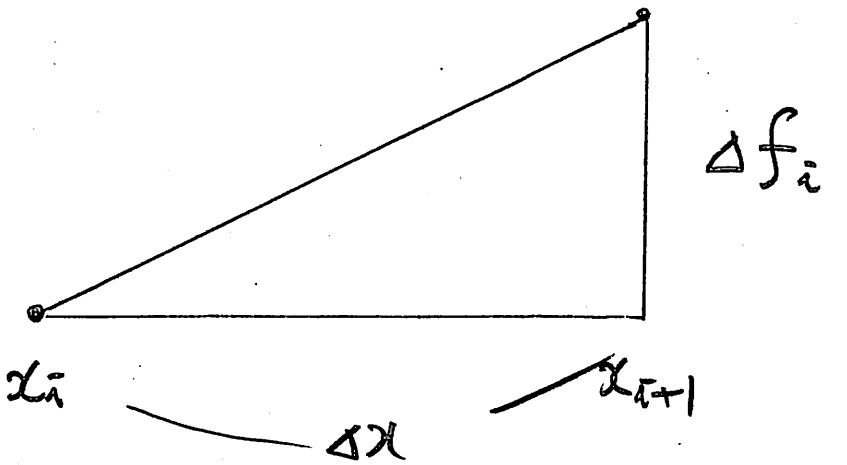
各 x_i で $\ell(x_i)=f(x_i)$



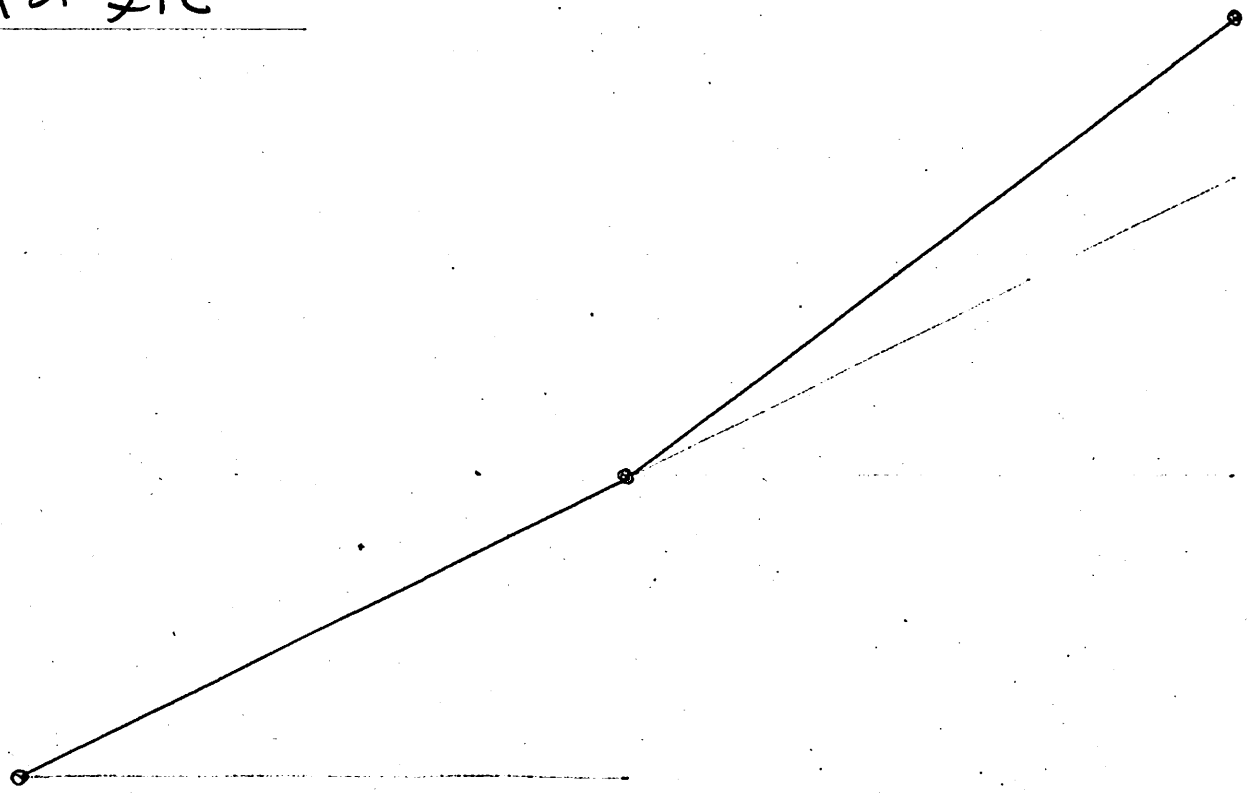
一区間の変化

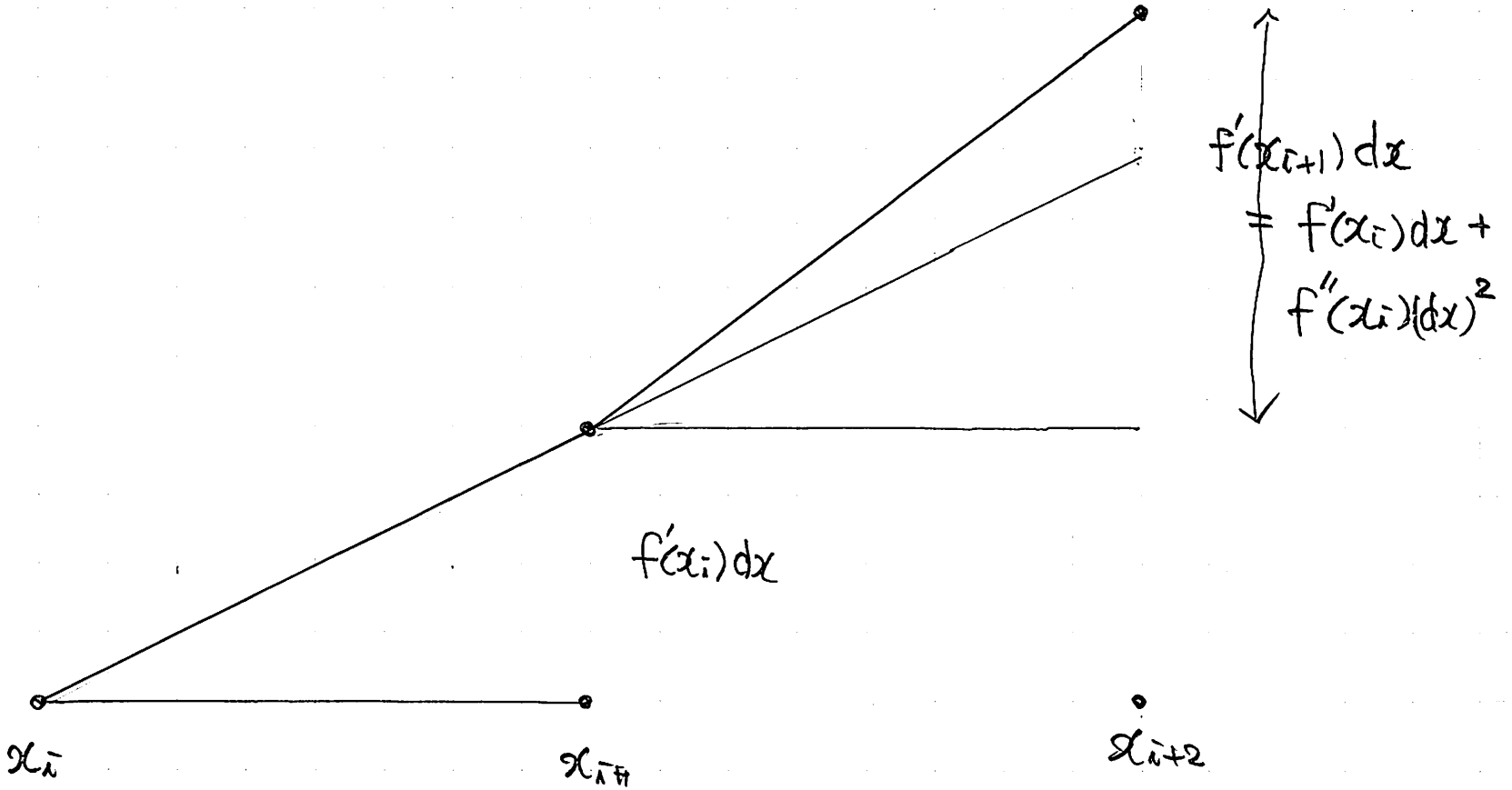
$$\Delta f_i \equiv f(x_{i+1}) - f(x_i) \quad \text{微差}$$

$$\frac{\Delta f_i}{\Delta x} \simeq f'(x_i) \rightarrow \Delta f_i \cdot \Delta x_i \simeq f'(x_i)\, dx$$

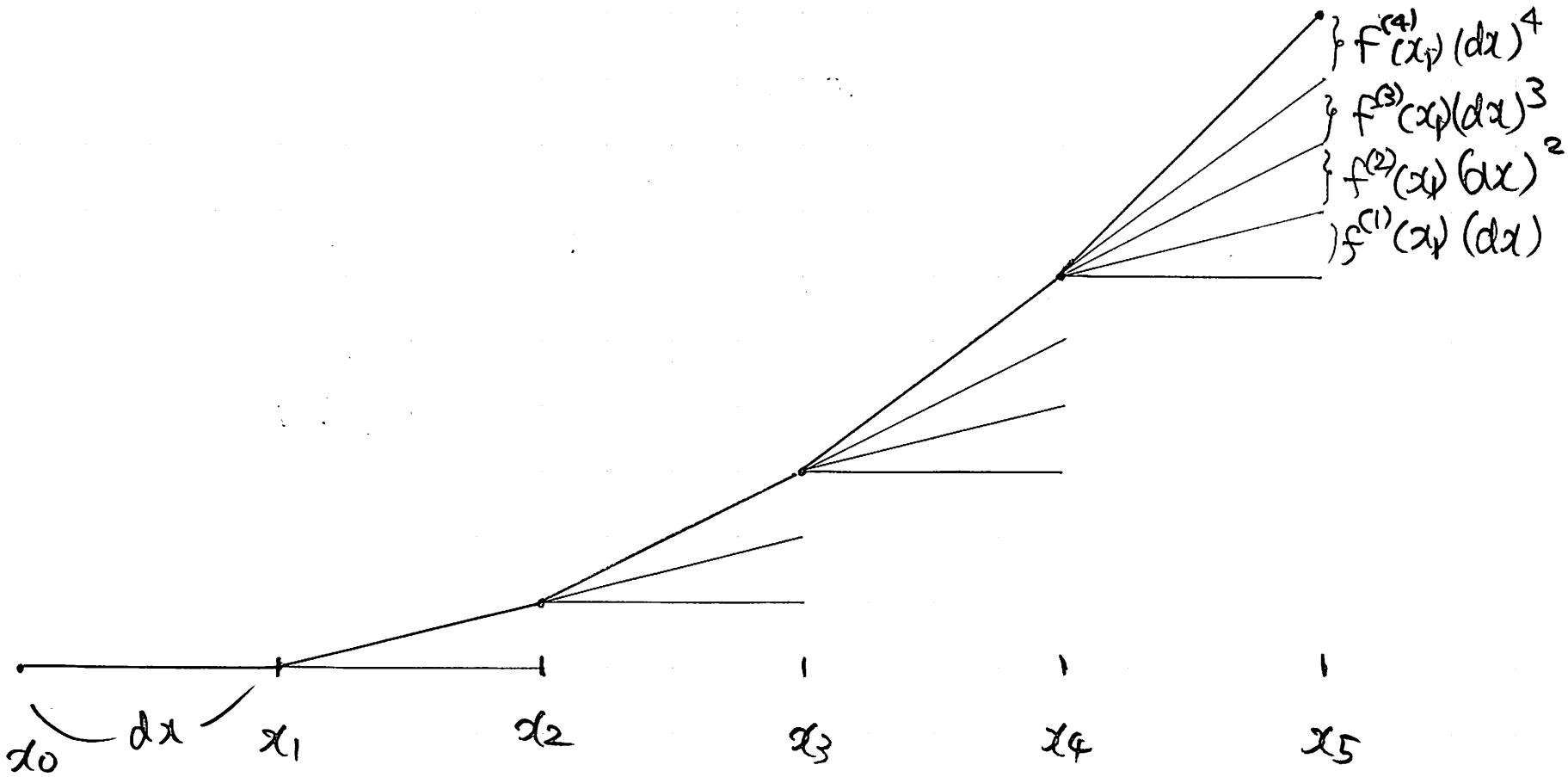


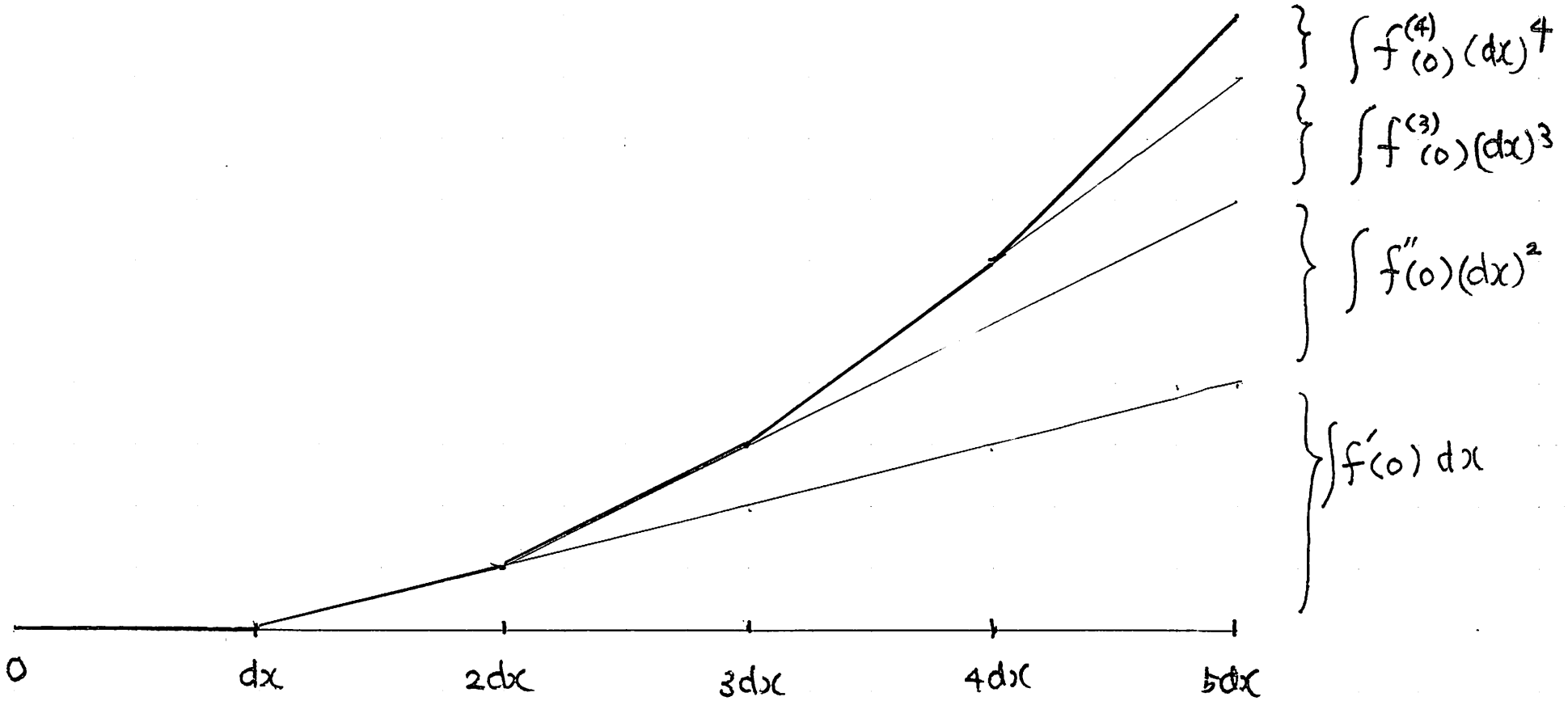
二次画の変化

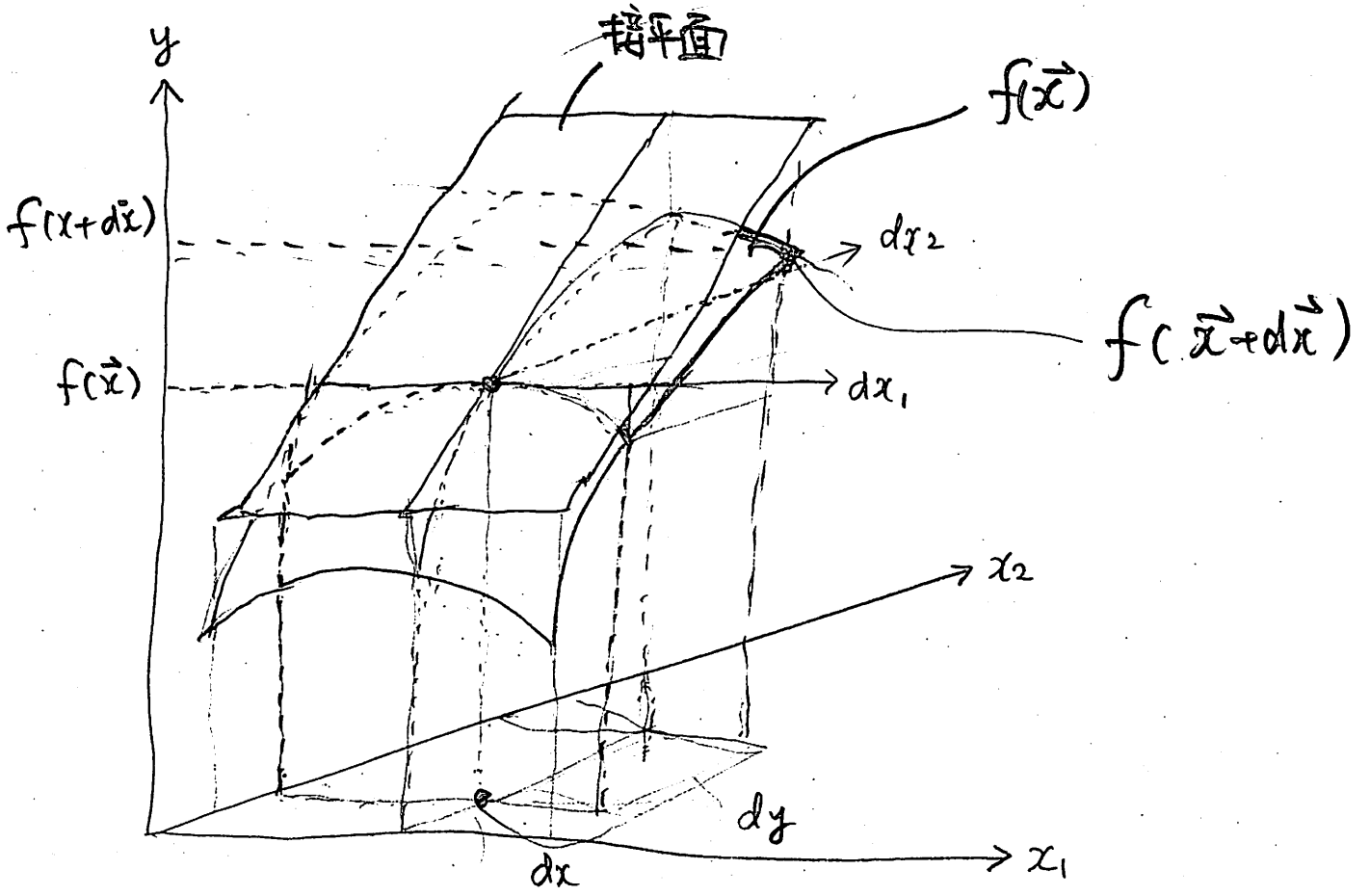



$f'(x_{i+1})\,dx$
$= f'(x_i)\,dx +$
$f''(x_i)(dx)^2$
$f'(x_i)\,dx$
x_i
x_{i+1}
x_{i+2}

4区画での変化

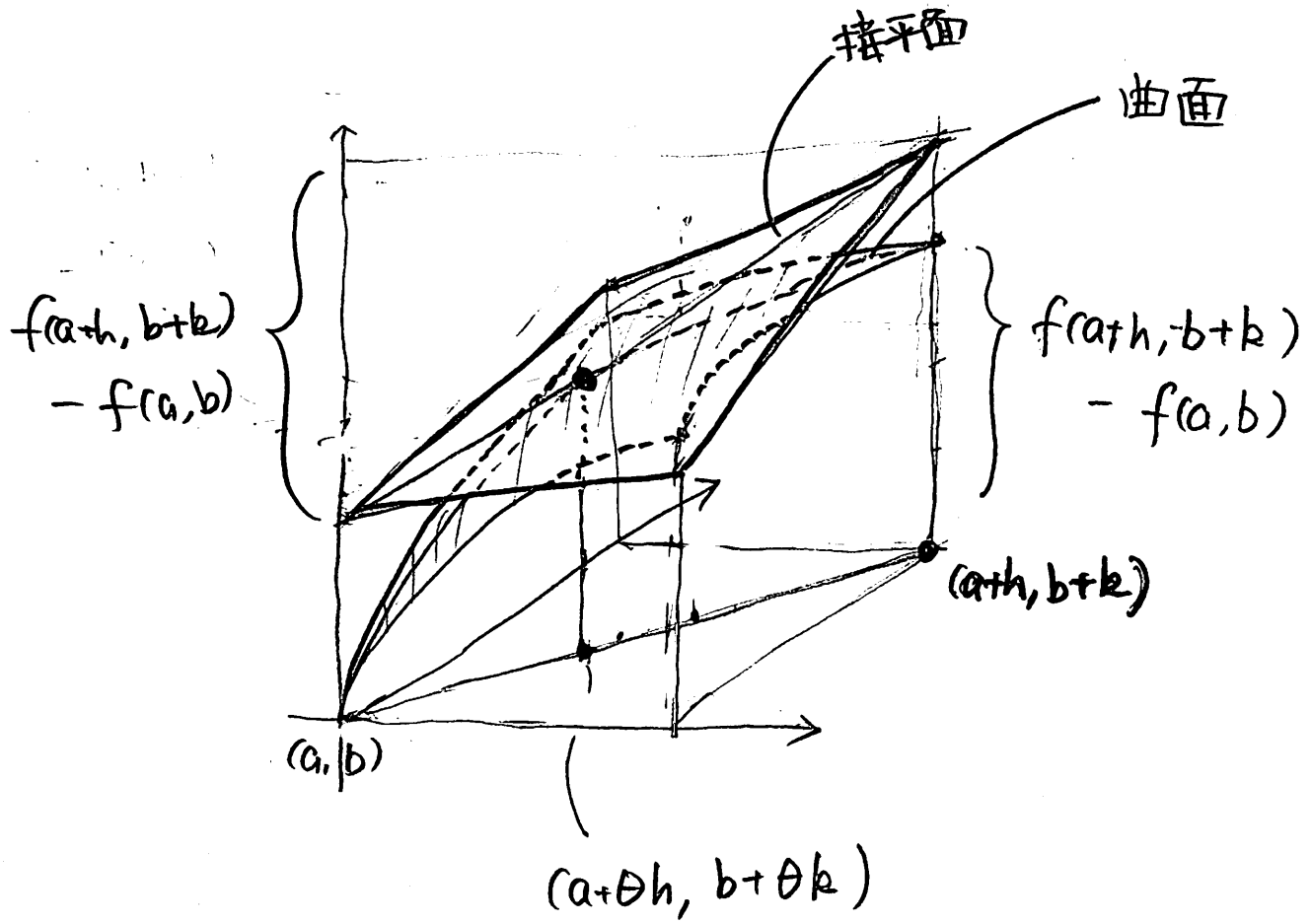


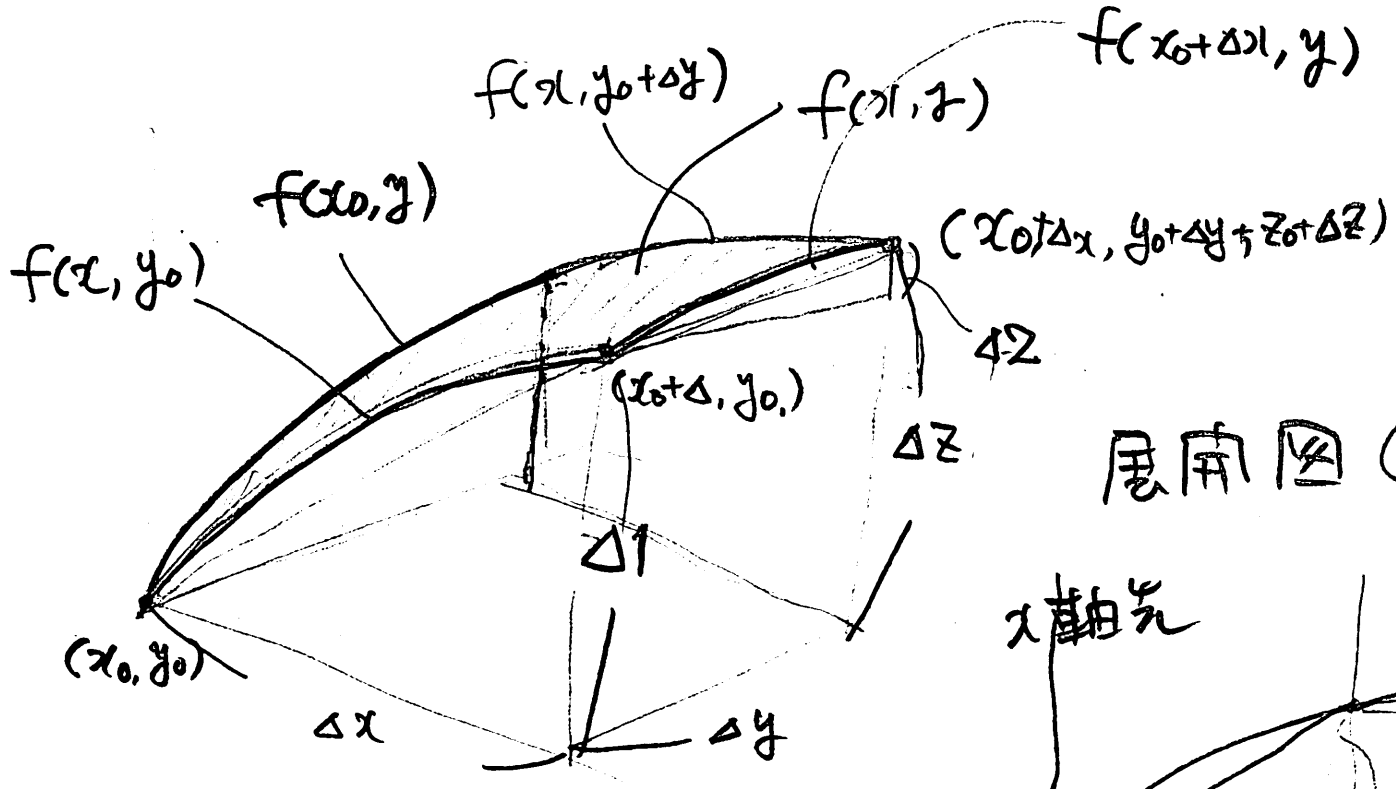

0
dx
2dx
3dx
4dx
5dx
$\int f^{(4)}_{(0)}(dx)^4$
$\int f^{(3)}_{(0)}(dx)^3$
$\int f''(0)(dx)^2$
$\int f'(0)\,dx$



$\vec{x}$

森数αベクトル解析
から


割平面
曲面
f(a+h, b+k)
− f(a,b)
f(a+h, b+k)
− f(a,b)
(a+h, b+k)
(a, b)
(a+θh, b+θk)

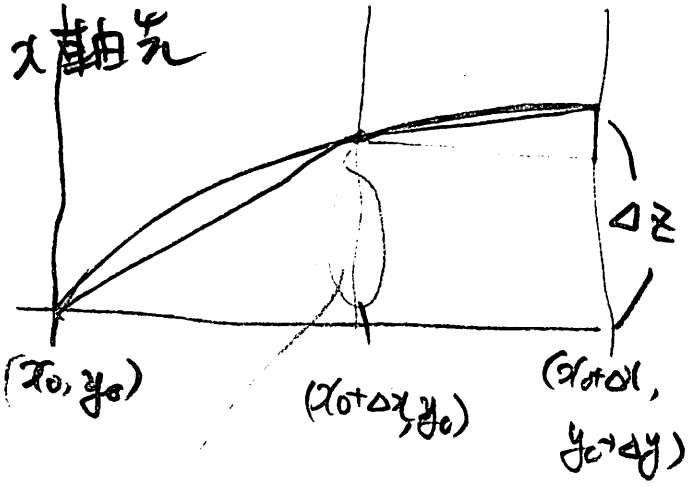


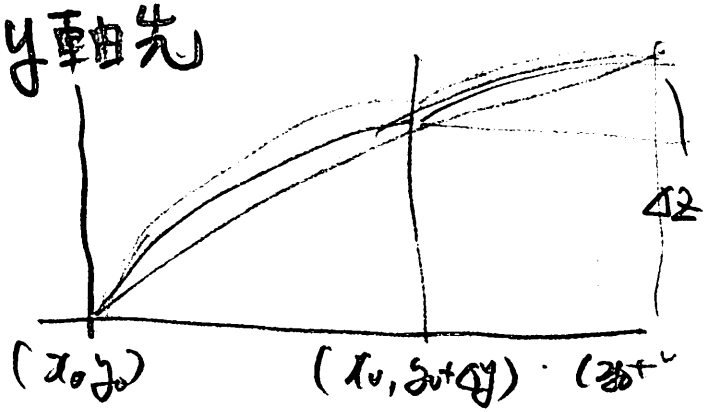
2変数関数の変化量 Δz

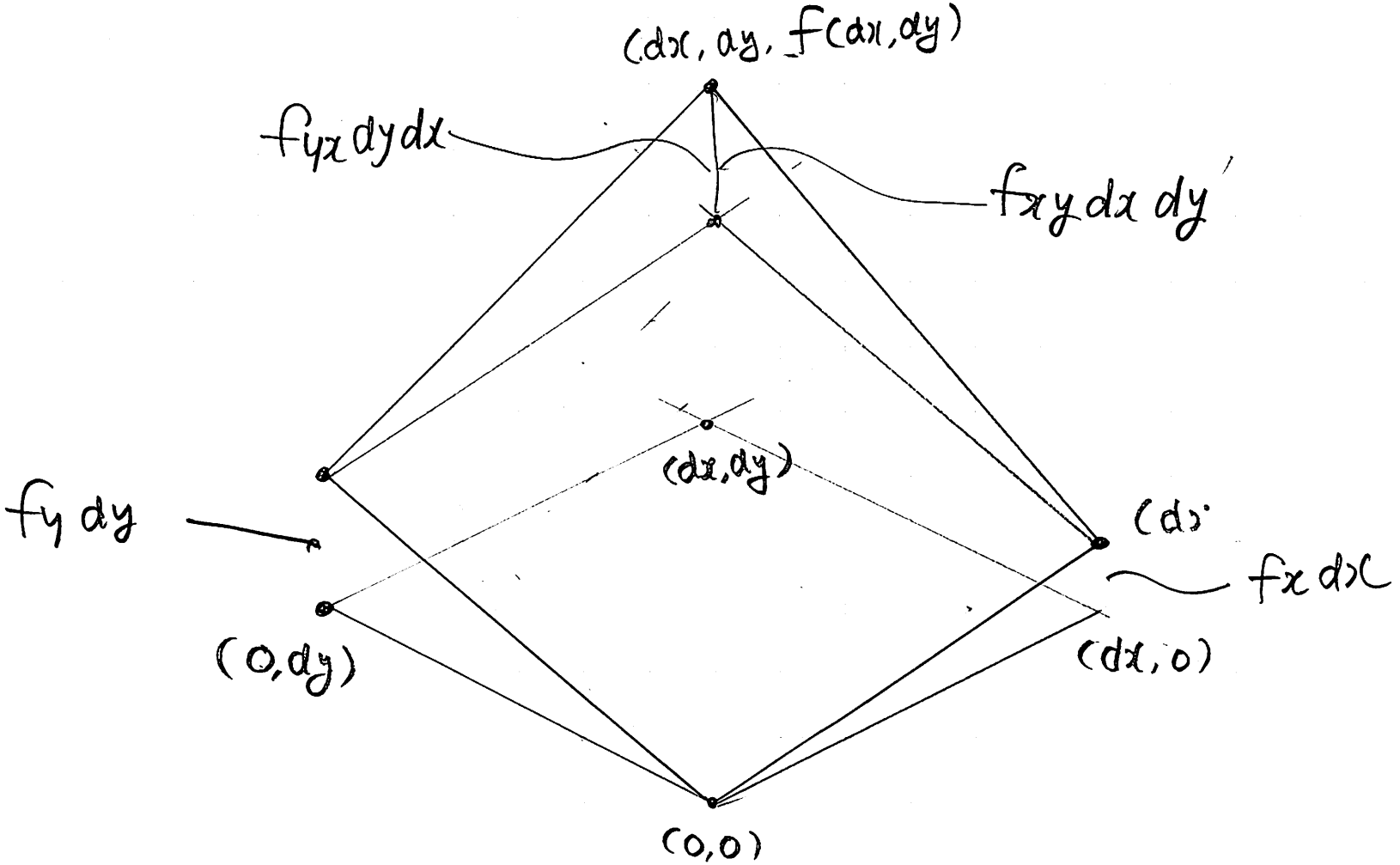
$$\lim_{\substack{\Delta x \to 0 \\ \Delta y \to 0}} \Delta z = dz \quad (\text{全微分})$$

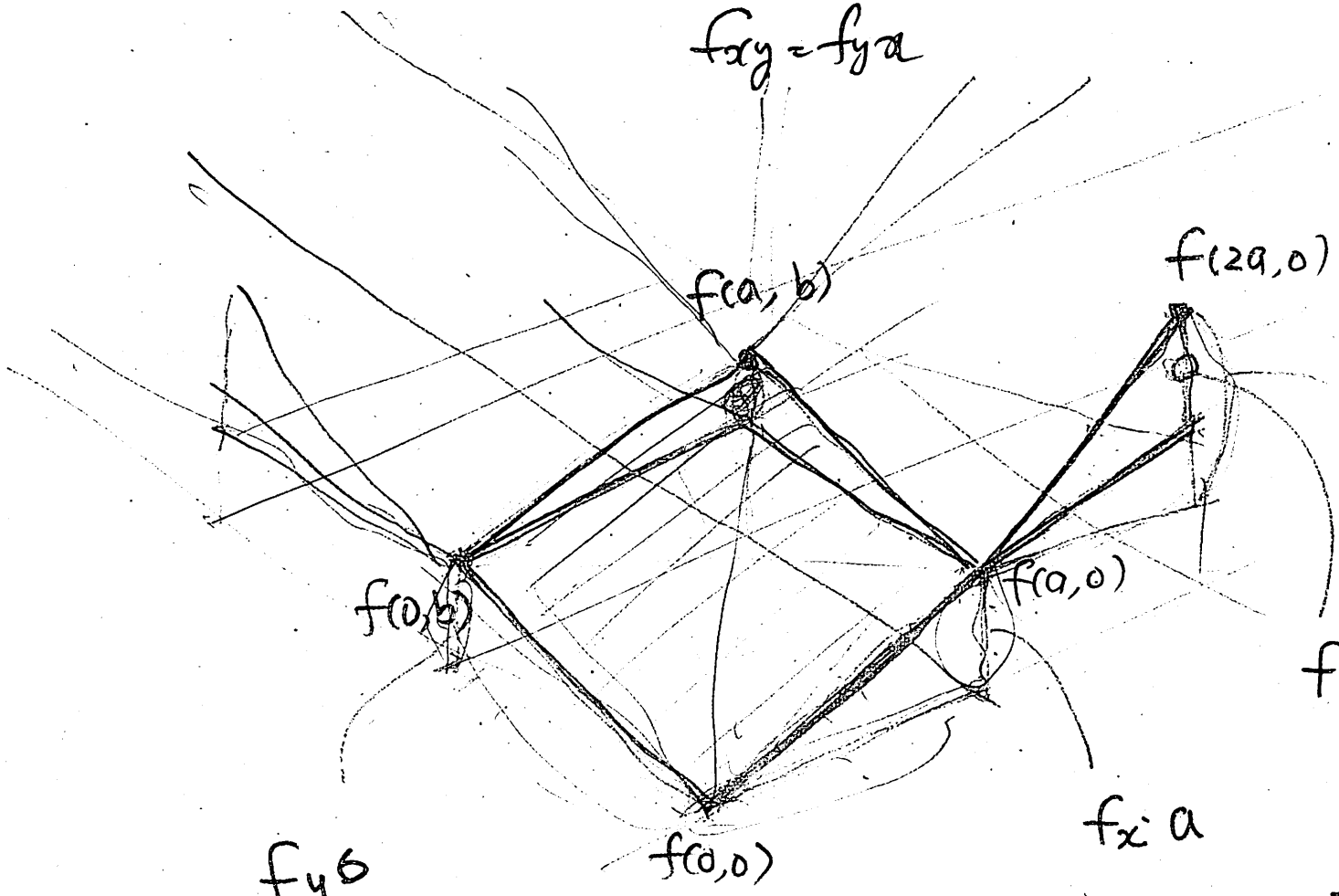
全成分の変化量の合計

展開図（一変数の和）






(dx, dy, f(dx,dy)
fyx dy dx
fxy dx dy
fy dy
(dx,dy)
(dx
fx dx
(0,dy)
(dx,0)
(0,0)



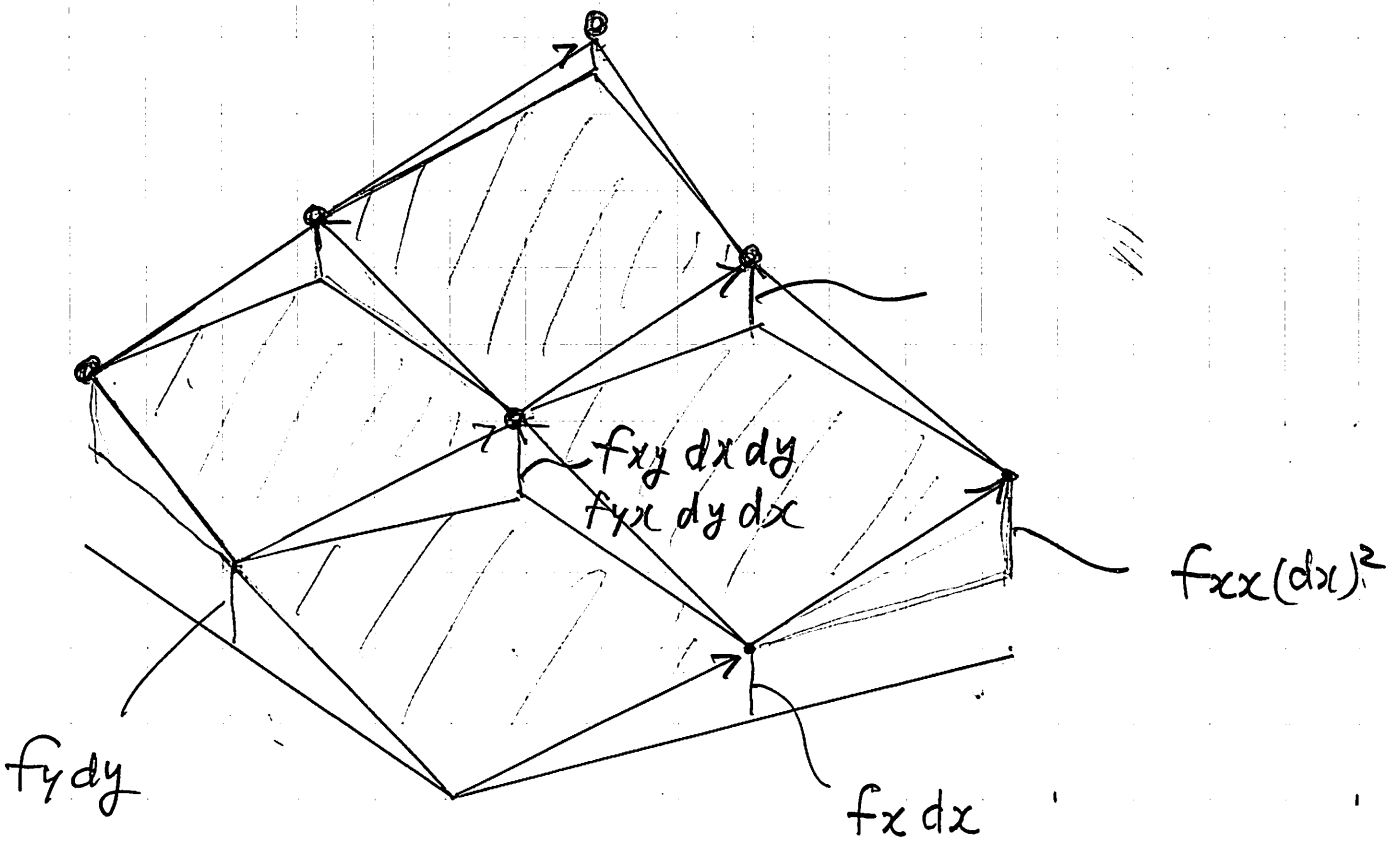
$$\frac{f^{(n)}(a)x^n}{n!}$$

$$dz = f_x\,dx + f_y\,dy$$

$$f_{xx}$$

$$\frac{f(2a,b) - f(a,0)}{a} - \frac{f(a) - f(0)}{a}$$

$$= \frac{f(2a,0) - 2f(a,0) + f(0,0)}{a^2}$$



$$d(d(z)) = f_{xx}(dx)^2 + 2f_{xy}(dx)(dy) + f_{yy}(dy)^2 \quad \text{on } \boxed{X}$$