In Anal Notes. $\nabla^2 \to \nabla$ in vector product rule

$$\left(\frac{m}{m-1}\right)^{1/2} \nabla d = \left(\frac{m-1}{m}\right)^{1/2} \left(\frac{1}{V_m}\right) \otimes \left(\sqrt{m}\,\nabla\mu + \nabla X_m\right)$$

$$\sim \frac{\sqrt{m}\,\mu + X_m}{2V_m^{3/2}} \nabla V_m$$

$$\Rightarrow \left(\frac{m}{m-1}\right)^{1/2} \nabla^2 d \equiv$$

1.4 Anal.

shall have $f: \mathbb{R}^n \to \mathbb{R}^m$ def: mat $n \times m$.

$\nabla f \in \mathbb{R}^{n \times m}$

$f: \mathbb{R}^m \to \mathbb{R}$

∇f: row vector $\to \mathbb{R}^n$

: $n \times 1$ column vector

$$\nabla_t(a \nabla_t b(h))(h) = (\nabla_t a)(h) \times (\nabla_t b)(h) \in \mathbb{R}^n$$

$$+ a(t)\,\nabla_t(\nabla_t b(h))(h)$$

$$= h^T(\nabla_t b)^T (\nabla_t a) h + a\, h^T \nabla^2 b\, h.$$

$a: \mathbb{R}^m \to \mathbb{R}$

$a\nabla^2 b = (\nabla_t b \cdot h)$

$h^T \nabla_t b$

$a(t): \mathbb{R} \to \mathbb{R}^n$.