

$K: B \rightarrow \mathbb{R}$ convex

$$K((1-\lambda)u + \lambda v) \leq (1-\lambda)K(u) + \lambda K(v) \quad \lambda \in [0,1]$$

$$dK(u)[h] = \lim_{t \rightarrow 0} t^{-1} (K(u+th) - K(u))$$

$$= \langle \nabla K(u), h \rangle_{*B, B}$$

②

$$K(v) - K(u) \geq \langle \nabla K(u), v - u \rangle_{*B, B}$$

③

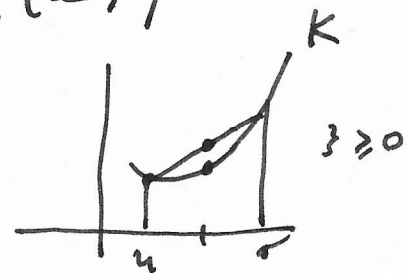
$$\langle \nabla K(v) - \nabla K(u), v - u \rangle_{*B, B} \geq 0$$

$$d^2K(u)[h, k] = \langle \text{Hess } K(u)h, k \rangle_{B, B}$$

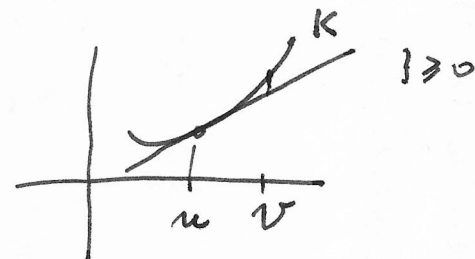
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$$\langle \text{Hess } K(u)h, h \rangle_{B, B} \geq 0$$

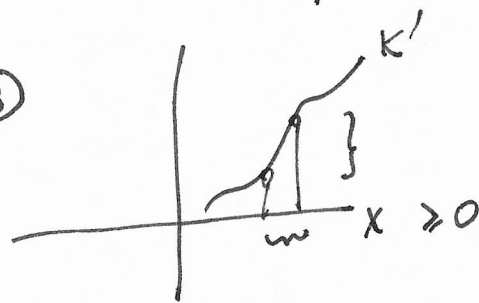
①



②



③



④

