(iii)' - EGONKORTASUNERAKO BALDINTZEN ONDORIOZTAPENA KUANTITATIBOA

$$d^2u = \frac{1}{2}\left[u_{ss}(ds)^2 + 2u_{sv}\,ds\,dv + u_{vv}(dv)^2\right]$$

$$T = T(s,v)$$

$$dT = \left(\frac{\partial T}{\partial s}\right)ds + \left(\frac{\partial T}{\partial v}\right)dv \qquad \left(\frac{\partial u}{\partial s}\right) \equiv T$$

$$dT = u_{ss}\,ds + u_{sv}\,dv$$

$$ds = \frac{1}{u_{ss}}\left[dT - u_{sv}\,dv\right]$$

$$(ds)^2 = \frac{1}{u_{ss}^2}\left[dT - u_{sv}\,dv\right]^2$$

$$= \frac{1}{u_{ss}^2}\left[(dT)^2 + u_{sv}^2(dv)^2 - 2u_{sv}\,dT\,dv\right]$$

$$d^2u = \frac{1}{2}\left[u_{ss}\left\{\frac{1}{u_{ss}^2}\left((dT)^2 + u_{sv}^2(dv)^2 - 2u_{sv}\,dT\,dv\right)\right\} + 2u_{sv}\left\{\frac{1}{u_{ss}}(dT - u_{sv}\,dv)\right\} + u_{vv}(dv)^2\right]$$

$$d^2u = \frac{1}{2}\left[\frac{1}{u_{ss}}(dT)^2 + \left(u_{vv} - \frac{u_{sv}^2}{u_{ss}}\right)(dv)^2\right]$$

$d^2u \geq 0$

| | |
|---|---|
| $\frac{1}{u_{ss}} \geq 0$ <br> $\left(u_{vv} - \frac{u_{sv}^2}{u_{ss}}\right) \geq 0$ | $\left(u_{vv}u_{ss} - u_{sv}^2\right) \geq 0$ |