

"Comment on P386. The positivity of a current implies that it is order zero in the sense of distributions.

For example, $n=2$, $p=1$

$$T = \frac{\sqrt{-1}}{2} (t_{11} dz_1 \wedge d\bar{z}_1 + t_{12} dz_1 \wedge d\bar{z}_2 + t_{21} dz_2 \wedge d\bar{z}_1 + t_{22} dz_2 \wedge d\bar{z}_2)$$

On P154 ~ P156 note, we showed t_{ij} 's are distributions of zero order. $\Rightarrow T$ is a current of zero order.

The function φ is called a potential for T , and it is unique up to adding a real function γ with $\partial\bar{\partial}\gamma=0$.

\square f is holomorphic and $f = \gamma + i \operatorname{Im} f$.

$$\partial\bar{\partial}f = \partial\bar{\partial}\gamma + i\partial\bar{\partial}\operatorname{Im}f = 0$$

$$\partial\bar{\partial}\gamma = \partial\left(\frac{\partial\gamma}{\partial\bar{z}_i} d\bar{z}_i\right) = \frac{\partial^2\gamma}{\partial z_j \partial\bar{z}_i} dz_j \wedge d\bar{z}_i$$

$$= \frac{\partial^2\gamma}{\partial z_1 \partial\bar{z}_1} dz_1 \wedge d\bar{z}_1 + \frac{\partial^2\gamma}{\partial z_1 \partial\bar{z}_2} dz_1 \wedge d\bar{z}_2 + \frac{\partial^2\gamma}{\partial z_2 \partial\bar{z}_1} dz_2 \wedge d\bar{z}_1 + \frac{\partial^2\gamma}{\partial z_2 \partial\bar{z}_2} dz_2 \wedge d\bar{z}_2$$

$$= \left(\frac{\partial^2\gamma}{\partial x_1^2} + \frac{\partial^2\gamma}{\partial y_1^2}\right) dz_1 \wedge d\bar{z}_1 + \dots$$

$$\partial\bar{\partial}\operatorname{Im}f = \left(\frac{\partial^2 g}{\partial x_1^2} + \frac{\partial^2 g}{\partial y_1^2}\right) dz_1 \wedge d\bar{z}_1 + \dots$$

$$\text{where } \operatorname{Im}f = g. \quad \Rightarrow \quad \frac{\partial^2\gamma}{\partial x_1^2} + \frac{\partial^2\gamma}{\partial y_1^2} + i\left(\frac{\partial^2 g}{\partial x_1^2} + \frac{\partial^2 g}{\partial y_1^2}\right) = 0$$

$$\Rightarrow \frac{\partial^2\gamma}{\partial x_1^2} + \frac{\partial^2\gamma}{\partial y_1^2} = 0 \text{ and } \frac{\partial^2 g}{\partial x_1^2} + \frac{\partial^2 g}{\partial y_1^2} = 0. \quad \frac{\partial^2\gamma}{\partial z_1 \partial\bar{z}_1} = 0$$

$$\frac{\partial^2\gamma}{\partial z_1 \partial\bar{z}_1} =$$

Stupid !

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