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Microlocal Version of the thm of Kawamata-Viehweg-Nadel

Kohn : $Lu=f$ $\|L^*g\| \geq c\|g\|$?

$H^1(X, \mathcal{J}_\varphi(L+K_X))=0$

$\bar\partial u = f$ $\exists$ complex foliation of X. $\bar\partial f|_F = 0$

$\Theta \geq c\omega$ on the quotient defined by F.

$$\begin{tikzcd} F & X \arrow[l] \arrow[r] \arrow[d] & Y \arrow[dl] \\ & \Delta & \end{tikzcd}$$

Foliation fibers

Hörmander idea of taking a detour

Kay analytic tool.

2nd case of the modified restriction of the curvature current of the metric of minimum

$\Theta_{K_X} = \sum_j r_j Y_j + R$

$(\Theta K_X - r_1 Y_1)|_{Y_1} = \sum_j r_j^{(1)} Y_j^{(1)} + R^{(1)}$

$(\Theta K_X - \gamma_1 Y_1)|_{Y_1} - \gamma_1^{(1)} Y_1^{(1)}|_{Y_1^{(1)}} = \cdots$

$\Theta' = \sum_j \gamma_j' Y_j' + R'$ on $Y' = Y_1^{(2)}$

1st case. either $R' \neq 0$ or $\infty \# \eta \gamma_j' > 0$

2nd case $R=0$ only finite $\# \eta \gamma_j > 0$

Shokurov: $\Theta' = \sum_{j=1}^{J} \gamma_j' Y_j'$ $(J<\infty)$

2nd case inevitably arises eventually before one gets down to the zero dim.

Review the goal of the strategy of techinque for Fujita Conj type problems

(precedor. Kawamata on numerical eff. K_X)

~~minimum~~ center of log canonical regularity

(X, mL) fail to do it at y.

$\frac{1}{\sum_j \gamma_j'}$ if $\exists$ a motion g less you can interporlate

$\Gamma(Y, mL|Y)$ add $K_{\bar X}$

Shokurov. slight modification ~~red~~ reduced. constraint minimal center $= Y'$ $Y' \subset Z$

counting X surface (cpt alg)

$\Theta_{K_X} = \gamma C + R$. C nonsingular curve in X

m-can. sig. vanishing across C to order $> m\gamma$

$H^1(X, (\mathcal{J}_C)^{m\gamma+1}(mK_X + \underbrace{K_X}_{\text{vol form}})) = 0$

$\Theta_X - \gamma C|_C$

$\Theta_{K_X} = \sum_j \gamma_j^{(0)} Y_j^{(0)} + R^{(0)}$

Kawamata : $\underset{(m \gg 0)}{mK_X}$ is globally generated by sections at points zero lelong # $\eta\, \Theta_{K_X}$

codim 1 $Y = Y_1^{(0)}$, $S_1, \dots, S_n$ $\frac{1}{\sum_j |S_j|^2}$ unreduced structure $\mathcal{O}_X/\mathcal{Y}$ supp $\mathcal{O}_X/\mathcal{Y}$

many not be in Y.

work with Y. $\mathcal{O}_X/\mathcal{Y}$ extra support Z $Y \cap Z \subset \{$lelong # $x\}$

2nd case Shokurov "section"

s zero at pts η lelong # > 0

threefold X. Base pt set to a curve C.

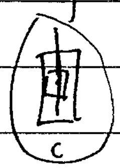
may happen $\bigcup_\sigma Z_\sigma = C$

pluricanonical section $|_{S_\sigma}$ vanish ord along C removed. = scalar multiple / to Shokurov section

Shokurov's section is from the regularity of the modified restriction of the curvature current

Higher codim: Shokurov's section (directed Shokurov section) for the curvature current of the "normal bundle".

X



S_σ defined by s_σ.

S_τ Artinian subscheme