$(CC(\mathcal{F}), dp_L^{\circ})_{T^*X,u}$ の計算

$A = \sum m_a C_a$

$\mathbb{P}(\hat{A}) = \sum m_a \mathbb{P}(\hat{C}_a)$. $X \times_{\mathbb{P}} Q$ a cycle codim n

補題. $(A, dp_L^{\circ})_{T^*X,u} = (\mathbb{P}(\hat{A}), X_L^{\circ})_{X\times_{\mathbb{P}} Q, u}$.

$A = C_a = C$ としてよい

$$(C, dp_L^{\circ})_{T^*X,u} = (\mathbb{P}(C), \overline{dp_L^{\circ}})_{\mathbb{P}(T^*X),u} = (\mathbb{P}(\tilde{C}), \underset{X_L^{\circ}}{\underset{\parallel}{\overline{d\tilde{p}_L^{\circ}}}})_{X\times_{\mathbb{P}} Q,u}.$$

$$\begin{tikzcd} X_L^{\circ} \arrow[r] \arrow[d, "p_L^{\circ}"'] & X \times_{\mathbb{P}} Q \arrow[d] \\ L \arrow[r] & \mathbb{P}^\vee \end{tikzcd} \qquad \begin{tikzcd} \mathbb{P}_L^{\circ} = \mathbb{P} - A_L \arrow[r] \arrow[d, "\tilde{p}_L^{\circ}"'] & Q \arrow[d] \\ L \arrow[r] & \mathbb{P}^\vee \end{tikzcd}$$

univ. sub line bdle

$$\mathbb{P}_L^{\circ} \times_L T^*L \to T^*\mathbb{P}_L^{\circ} \quad = \quad \mathbb{P}_L^{\circ} \times_Q T^*_Q(\quad) \to T^*\mathbb{P}_L^{\circ}$$

$$0 \to \mathbb{P}_L^{\circ} \times_Q T^*_Q(\mathbb{P} \times \mathbb{P}^\vee) \to (\mathbb{P}_L^{\circ} \times_{\mathbb{P}} T^*\mathbb{P}) \oplus (\mathbb{P}_L^{\circ} \times_{\mathbb{P}} T^*L) \to T^*\mathbb{P}_L^{\circ} \to 0$$

exact

係数 m_a の決め方

$$\begin{tikzcd} X \times_{\mathbb{P}} Q \arrow[r, "p^\vee"] & \mathbb{P}^\vee \\ \mathbb{P}(\tilde{C}_a) \arrow[u, phantom, "\cup"] \arrow[r] & D_a \arrow[u, phantom, "\cup"] \end{tikzcd}$$

gen. radicial, $a \neq b \Rightarrow D_a \neq D_b$

(L, D_a) transversal.

$\Rightarrow (\mathbb{P}(\tilde{C}_a), X_L^{\circ})_u = [\xi_a, \eta_a]$ insep

$A = \sum m_a C_a$ $\quad (\mathbb{P}(A), X_L^{\circ})_u = m_a \cdot [\xi_a, \eta_a]_{insep}$

$= -\operatorname{dimtot} \varphi_u(\mathcal{F}, dp_L^{\circ})$

$$m_a = -\frac{\operatorname{dimtot}}{[\xi_a, \eta_a]_{insep}}$$

Can one do this?

universal family of lines in $\mathbb{P}^\vee$

$$\mathbb{G} = Gr(1, \mathbb{P}^\vee) = \{\text{lines in } \mathbb{P}^\vee\} = \{\text{planes in } E\} = Gr(2,E)$$

$$\mathbb{P}^\vee = Gr(0, \mathbb{P}^\vee) = \{\text{points in } \underset{\mathbb{P}(E)}{\overset{\|}{\mathbb{P}^\vee}}\} = \{\text{lines in } E\} = \mathbb{P}(E)$$

$$= \{\text{hyperplanes in } \mathbb{P}\}$$

$$\mathbb{D} = \text{univ. lines in } \mathbb{P}^\vee$$
$$= \{(H,L) \in \mathbb{P}^\vee \times \mathbb{G} \mid H \in L\}$$
$$= Fl(1,2,E)$$

$$\begin{array}{ccccc} \mathbb{P}^\vee & \leftarrow & \mathbb{D} & \to & \mathbb{G} \\ & & \cup & & \in \\ & & L & \to & \{L\} \end{array}$$

blow up at $X \times_{\mathbb{P}} \mathbb{A}$

$$\begin{array}{ccccccc} \mathbb{P}(\hat{C}) \subset X \times_{\mathbb{P}} Q & \leftarrow & (X \times \mathbb{G})' & \to & X \times \mathbb{G} \\ \downarrow & \square & \downarrow & & \downarrow \\ \mathbb{P}^\vee & \leftarrow & \mathbb{D} & \to & \mathbb{G} \end{array}$$

$\mathbb{A}$ univ. family of axis

$$\begin{array}{ccc} (X\times\mathbb{G})^\circ & & X_L^\circ \\ \downarrow & \text{の fiber} & \downarrow p_L \\ \mathbb{D} & & L \end{array}$$

$$(X \times \mathbb{G})^\circ = X \times \mathbb{G} - X \times_{\mathbb{P}} \mathbb{A}$$

$(X \times \mathbb{G})^\square \subset (X \times \mathbb{G})^\circ$ $\mathbb{P}(\hat{C})$の逆像 $Z(C)$ が $\mathbb{G}$上 q.f となる最大の開.

$$\begin{tikzcd} Z(\hat{C}) \subset (X \times \mathbb{G})^\square \arrow[r, "f"] \arrow[dr, "p"'] & \mathbb{D} \\ & \mathbb{G} \end{tikzcd}$$

(u, L) q.f ✓ smooth curve $\mathbb{P}^1$-bdle

p.7 $p: (X \times \mathbb{G})^\square \to \mathbb{G}$ loc acyclic
$f: (X \times \mathbb{G})^\square \to \mathbb{D}$ $Z(C)$ の外で loc. acyclic

dimtot $\varphi_u(\mathcal{F}, p_L^\circ)$ は $Z(\hat{C})$上の関数として constructible + $\mathbb{G}$上 平坦.
$\mathcal{F}$. $Z(\hat{C}_a)$ の dense open で const $\longrightarrow$ m_a.