

Thus we proved the generic element for each pencil contained in the system is smooth away from the base locus of the pencil. Even more, except a finite # of effective divisors in the pencil, rest of them are smooth away from the base locus of the pencil. The finite # of effective divisors may be smooth away from the base locus of the system. (this is not correct).

Two things are not clear.

- ① Why does it suffice to prove for a pencil?
- ② Is connected components of  $V-B$  discrete? (or finite)

$V-B = \bigcup C_\lambda$ , where  $C_\lambda$  is a connected component. (path-connected since  $V-B$  is an analytic variety, and so locally  $\mathbb{R}^k$  for some  $k$ ).

For each  $p \in V-B$ ,  $\exists$  a local defining function  $f_p$ .

$\Rightarrow$  By Weierstrass Preparation Theorem,  $\exists$  an open set  $U \ni p$  s.t.  $U \cap C \neq \emptyset$ , where  $C$  is the connected component of  $f_p$ .

$\Rightarrow$  With respect to subspace topology,  $C_\lambda$  is open for each  $\lambda$ .

$\Rightarrow$  Choose  $a_\lambda \in C_\lambda$ .

$\Rightarrow$  If  $\{a_\lambda\}$  is infinite,  $\exists$  a limit point  $a_0$  in  $\overline{V-B}$ , where the closure in  $M$ .  $\Rightarrow a_0 \in V-B$  or  $a_0 \in B$ .

If  $a_0 \in V-B$ , for any open set  $U \ni a_0$ ,  $\exists$  infinitely many  $a_\lambda$ 's in  $U$ .  $\Rightarrow$  Contradiction to discreteness.

If  $a_0 \in B$ ,  $\exists \{a_i\}$  convergent to  $a_0$

$\Rightarrow \frac{s_1}{s_2} = f$  meromorphic function.  $\Rightarrow f(a_i) \in \mathbb{P}^1$ .

$\lim_{i \rightarrow \infty} f(a_i) \stackrel{?}{=} f(a_0)$

$a_0 \in B = \bigcap_{i=1}^{\infty} D_{\lambda_i}$   
 $\Rightarrow f(a_0)$  have to have two different values.