

Let me explain what my notes are about and why they are related to Sasha's talk.

### Subject of the notes.

Let  $f: X \rightarrow Y$  be a morphism of smooth algebraic varieties. Associated to  $f$  is the following well known subset  $Z_f \subset T^*Y$ :

if  $y \in Y$  and  $\eta \in T_y^*Y$  then  $(y, \eta) \in Z_f$  if and only if there exists  $x \in f^{-1}(y)$  such that  $\eta \in \text{Ker}(T_y^*Y \rightarrow T_x^*X)$ .

(The idea is that  $Z_f$  measures the failure of  $f$  to be smooth.)

In the notes  $Z_f$  is denoted by  $\pi(K)$ . I discuss there the structure of  $Z_f$  assuming characteristic 0. However, Proposition 2 of the notes remains valid ~~without~~ in any characteristic, Proposition 1 remains valid under the following assumption: the map  $X_{r,\alpha} \rightarrow Y_{r,\alpha}$  is generically smooth for all  $r$  and  $\alpha$  (I am using the notation from the notes). This assumption is automatic in characteristic 0, but it doesn't hold in Deligne's examples mentioned by Sasha.

The relation with Sasha's talk is clear from the previous sentence and the following remark:  
if  $f: X \rightarrow Y$  is proper then  $SS(Rf_* \mathcal{O}_X) \subset Z_f$ .