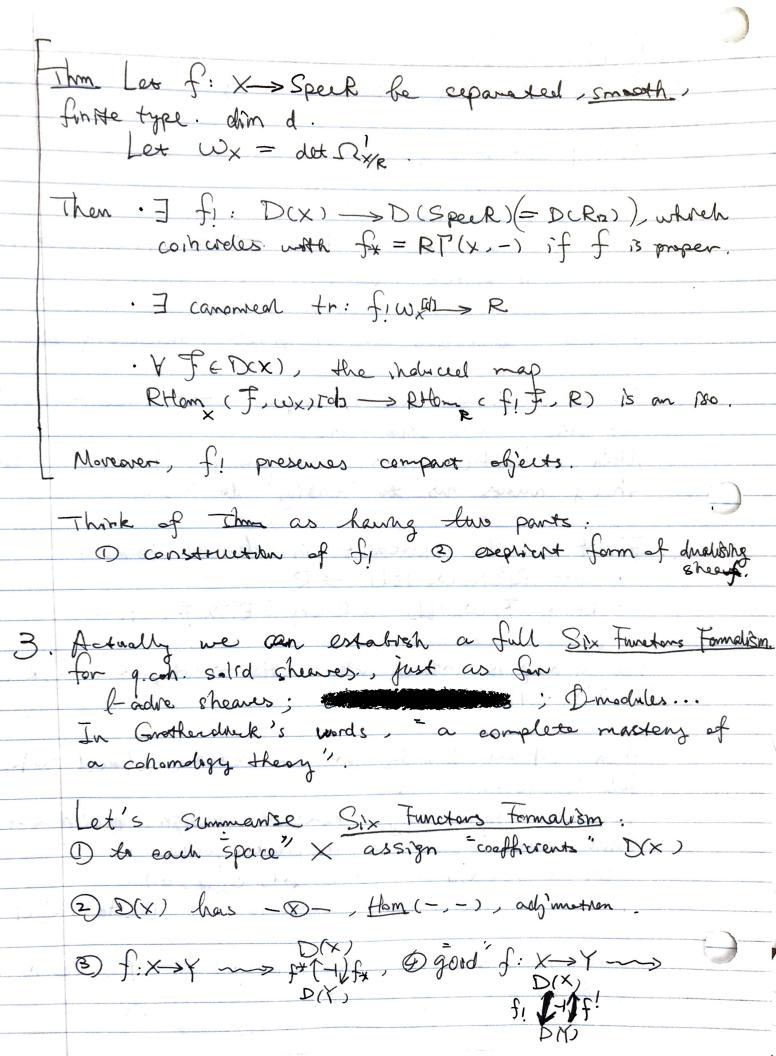
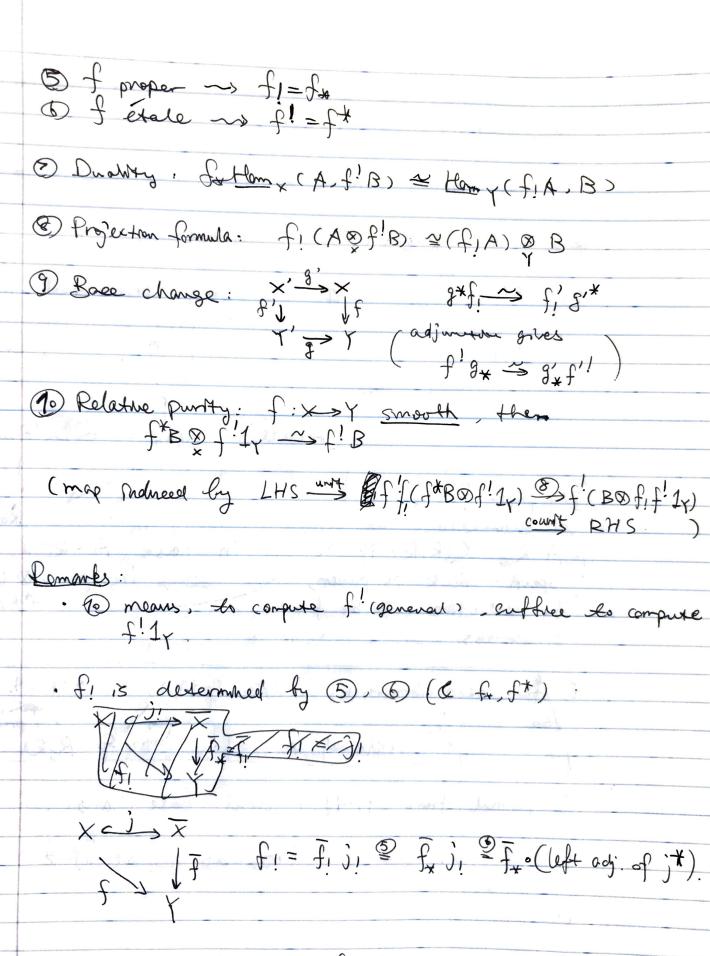
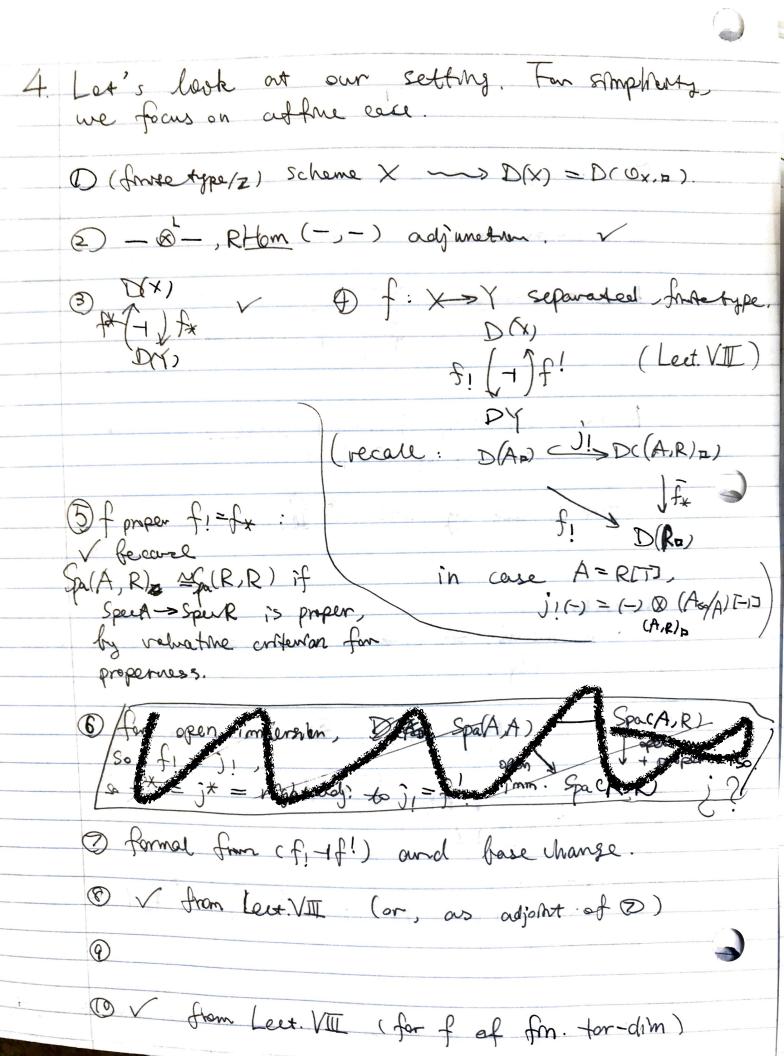
[Coherent Duality] 1. Pecall dassical Semo Duality. X: proper smooth / k dim d. Wx:= det \(\Omega'\times/k\). Wx:= det \(\tau \times / k \)

Then \(\text{\formula} \) committed tr: \(\text{\formula} (\text{\chi}, \omega_{\text{\chi}}) \times \(\text{\chi} (\text{\chi}, \omega_{\text{\chi}}) \tim Question: generalise to nonproper / nonsmooth/general base. We will disures the nonproper, case bose - Speek care but still assume smoothness. Main diffractly is in constructing (f! -1 f!), condensed theory allows no to = easily do this. 2. First rewrite statement in derived terms: · tr: R((X, Wx)[d] -> R · RHom (F, Wx)[d) -> RHom (RTCX.F), R) (second may is induced who LHS -> RHome (RT(Xf)_RP(X, Wo)) (d) ++> RHS.) Then Cohenent Buellty in our setting should take the following form: To each cfinite type, Scheme X assign = quasicohenent solid sheaves" (studied in previous facks): D(X):= D(Ox, =):= D((Oxed, Oxad)=).
For affines X = SpecA, this is just D(Az):=D(A,A)z). This is functional in X, for $f:X\to Y$, we have $f_X:$ forget, $f^X:-\infty(0_X)$: D(X)





· Key point in a Six fim-form. is construction of (f. If!)



poroal: (closed imm. We frest prove P. By Yoneda, it suffices to show: VNEDCRO). LEDCAO), RHoma (f*NO) f!R, L) = RHoma(fiv.L). Since f is of fin-tor-dim, fx=fi preserves compact of sets (Lee. VII), this implies its right adj. I! in turn has a right ady., denote it by for Then, RHoma (fth & fir, L) = RHoma (fth, RHoma (fir, U) = RHoma (N, for RHoma (R, for L)) Thanks = RHamp (N. RHamp (R, fpl)) = RHoma (No fal) = RHoma cf. N, L). to Mark and Peter To show Q frost use adjunction for f! If to find for an explicit formula for of! helping (X=RHoma (A.f.N) = PHoma (fiA,N)=RHoma (A)N). with So f!N=f*N@ RHome (A, R).
With this, @ is strongly forward. this proof! (A=RETI). Here we already have O by LeeVII. To show () we need an explicit formula for f! As above, f: N=RHome(f,AN). So fir=RHang (fix,R). Now recall from LeeVII: fiA = A D (Ao/A) [-1]. Since A. Ao/A are discrete hence already solid, tensor can be texten as A-mod. So actually fiA = (Ao/A)[-1] So fir= RHomp(Aoo/A,R)[] = A[] With this, 2) is straight forward. TAS R-Mod., AON/A = TTR I then wel fact RHOME (IR, R) & A RHOME (B, R) & RED.]

6. New we compute fire for closed rmm. and smooth map. a) Closed mmorson. f: Spec A -> Spec R. A= R/I. Assume I, 5 generated by a regular sequence. (algebraise reventor of (scally complete intersection.) From 5., f!R = RHom (R/I, R). The following computation 13 dassical (eg. Hartshorne II.7) Charles a generating veg. seq. (fi...fc) (c=codin of Speck) in Speck) Koszul complere 0> 1K, >--- > 1K, -> K > 0 is a free resolution of R/I, here / K = free R-mod. with generators [f.]....[f.]. k3 → k1-3: If JAMATER JET STANATER JAMATER So RHome (R/I,R) = RHome (K., R) if is matter on the state of th This i'so defends on charge of (fi). changing (fi) > (\(\mathcal{Z}\)cij) changes the iso. By x det (Cij) Note det(J/z) ~ R/I wa finishe > 1 so the iso. RHome (R/I,R) ~> det(7/2°)* [-C] i's independent of chaire. Mpshot fr=RHomp(R/I,R) ~ det(I/z) +[-C]

b) Smooth map f: Speck > Speck smooth, dm=d. We use the following track 2 a) to compute f.R Concrder Spend Spend Pi Spend

Rel If

Source Speck - 5 Speck $f'R = \Delta'P' f'R \qquad P_1 \circ \Delta \simeq id$ $= \Delta' (P' f'R \otimes P'A) \qquad P' = P' \otimes P'A$ $= \Delta' (P' f'R \otimes P'A) \qquad P' = P' \otimes P'A$ $= \Delta! \left(p^* f^! R \otimes p^* f^! R \right) \qquad A = f^* R \qquad P! f^* = p^* p^* f!$ $= \Delta^{*}(p_{i}^{*}f^{!}R \otimes p_{i}^{*}f^{!}R) \otimes \Delta^{!}(A \otimes A) \qquad \Delta^{!} = \Delta^{*} \otimes \Delta^{!}(A \otimes A)$ $(A \otimes A)_{*} \qquad A_{*} \qquad (A \otimes A) \qquad \Delta^{!} = \Delta^{*} \otimes \Delta^{!}(A \otimes A)$ = $f!R \otimes f!R \otimes (det \Omega_{AR})^*EdJ$ NEE a), and $I_{I}^{2} \cong \Omega_{AR}^{2}$ Since from computation in Lec. VIII, we know fix is inventible, the above gives f! R & det SAR [d] (=: WA/R) The Thm is proved by now.

Californi Sheeper (this Bey configure en ground) respective (click) of the production confidency is a series of