Contents

1 Ramification Index 2.6b

Definitions

$$\phi : C_1 \to C_2$$
$$\psi : C_2 \to C_3$$
$$f : C_2 \to K$$
$$f\phi : C_1 \to K$$

$$\operatorname{ord}_{\phi P}(t_{\phi P}) = 1$$
$$\operatorname{ord}_{\phi P}\left(t_{\phi P}^{e_\psi(\phi P)}\right) = e_\psi(\phi P) = \operatorname{ord}_{\phi P}(t_{\psi\phi P} \circ \psi)$$

Applying the pullback to $t_{\phi P}^{e_\psi(\phi P)}$ we get

$$\operatorname{ord}_P(t_{\phi P}^{e_\psi(\phi P)}\phi) = e_\psi(\phi P)\operatorname{ord}_P(t_{\phi P}\phi) = e_\psi(\phi P)e_\phi(P)$$

But we also apply it to $t_{\psi\phi P}\psi$ to get $t_{\psi\phi P}\psi\phi$ which has the same order. And note that $e_{\psi\phi}(P) = \operatorname{ord}_P(t_{\psi\phi P}\psi\phi)$.