

$$\mathbb{F}_q(\mathbb{P}) \subset \mathbb{F}_q(P) \xrightarrow{p} \mathbb{F}_q(\mathbb{P}^d)$$

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$$\mathbb{F}_q|P| \subset \mathbb{F}_q|P| \xrightarrow{\simeq} \mathbb{F}_q|\mathbb{P}^d|$$

$$P(\mathbb{F}_q) = P(\bar{\mathbb{F}}_q) \cap \mathbf{C}_{\mathbb{F}_q}(\bar{\mathbb{F}}_q)$$

$$\bar{P} = |\text{residue field}|$$

$${}^{-s}\zeta_P = \prod_P (1 - \bar{P}^s)^{-1} = \exp\left(\sum_{n \geq 1} \frac{q^{ns}}{n} |P(\mathbb{F}_{q^n})|\right) = \prod_{i \in g} (1 - \alpha_i q^s) (1 - q^s)^{-1} (1 - q^{1+s})^{-1}$$

$$\bar{\alpha}_i^2 = q$$