

$$\begin{array}{ccccccc}
P_0 & \longrightarrow & P_1 & \longrightarrow & \cdots & \longrightarrow & P_m \\
& & \downarrow & & \downarrow & & \downarrow \\
& & P_1/P_1 & \longrightarrow & \cdots & \longrightarrow & P_m/P_1 \\
& & \downarrow & & \downarrow & & \downarrow \\
& & P_1/P_1 \cap k[x_1, \dots, x_{n-1}] & \longrightarrow & \cdots & \longrightarrow & (P_m/P_1) \cap k[x_1, \dots, x_{n-1}]
\end{array}$$