# Exercises 2

① Let $f$ be homogeneous & $f = \sum g_i f_i$ where the $f_i$ are homogeneous

Show that $f = \sum \bar{g}_i f_i$ where $\bar{g}_i$ is homogeneous of degree $\deg f - \deg f_i$.

(Hint: let $\bar{g}_i$ be the homog. component of $g_i$ in degree $\deg f - \deg f_i$)

② $f = xy^2 + 1$, $g_1 = xy + 1$, $g_2 = y + 1$

Reduce $f$ via $G$ in the two possible ways & compare outcomes.

③ Compute Gröbner basis of $I = \langle F_1, F_2 \rangle$ where $f_1 = x^2 - y$, $F_2 = x^2 + (y-1)^2 - 1$

④ Compute Gröbner basis of $I = \langle F_1, F_2 \rangle$ where $f_1 = x^3 - 2xy$, $f_2 = x^2 y + x - 2y^2$