

# COMPUTATIONAL COMMUTATIVE ALGEBRA

## MACUALAY 2 HOMEWORK SET 1

Before Midnight on 5 February send me a Macaulay 2 file (extension m2) with the commands to perform the following:

- (1) Define the ring  $R = \mathbb{Q}[X, Y]$ .
- (2) Define the ideal  $I = \langle X^2 - Y^2 - 3, 2X^2 + 3Y^2 - 11 \rangle$ .
- (3) Ask for the minimal generators of  $I$ .
- (4) Check if  $I = \langle X^2 - 4, Y^2 - 1 \rangle$ .
- (5) Define the ideal  $J = \langle Y^2 - X \rangle$ .
- (6) Find  $I + J$ .
- (7) Find  $I \cap J$ .
- (8) Find  $IJ$ .
- (9) Find  $\sqrt{J}$ .