F. Winkler   solve by 23 March 2010

Commutative Algebra & Algebraic Geometry
SS 2010

(4) Determine a rational parametrization of the circle

$$x^2 + y^2 = 1 \ .$$

(5) Decide whether the following algebraic curve $\mathcal{C}_5$ defined by

$$f_5(x, y) = y^2 - x^3 + x^2 + x - 1 = 0$$

is rational (parametrizable), and if so, compute a rational parametrization:

(6) Decide whether the following algebraic curve $\mathcal{C}_6$ defined by

$$f_6(x, y) = y^2 - x^3 + x = 0$$

is rational (parametrizable), and if so, compute a rational parametrization:

(7) Consider the algebraic curve $\mathcal{C}_7$ having the rational parametrization

$$P(t) = \left(\frac{t^5 + 1}{t^2 + 3} , \ \frac{t^3 + t + 1}{t^2 + 1} \right) \ .$$

Compute the implicit defining polynomial $f_7(x, y)$ of $\mathcal{C}_7$.