

Assignment-19

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Abstract—This assignment deals with the polynomials.

Download latex codes from

<https://github.com/satyam463/Assignment-19/blob/main/Assignment%2019%20.tex>

$$\frac{13}{9}x^2 + \frac{2}{3}x - 2 = \left(-\frac{126}{169}x - \frac{558}{169}\right)\left(-\frac{169}{1134}x - \frac{61009}{1134}\right) + \left(\frac{10309}{441}\right) \quad (2.0.6)$$

Since it contains scalar polynomial hence the g.c.d of $f(x)$, $g(x)$ is 1.

1 PROBLEM STATEMENT

Find the g.c.d of each of the following pairs of polynomials.

$$2x^5 - x^3 - 3x^2 - 6x + 4, x^4 + x^3 - x^2 - 2x - 2 \quad (1.0.1)$$

2 SOLUTION

Let the field be rational numbers

$$f(x) = 2x^5 - x^3 - 3x^2 - 6x + 4 \quad (2.0.1)$$

$$g(x) = x^4 + x^3 - x^2 - 2x - 2 \quad (2.0.2)$$

$$2x^5 - x^3 - 3x^2 - 6x + 4 = (x^4 + x^3 - x^2 - 2x - 2)(2x - 2) + (3x^3 - x^2 - 6x) \quad (2.0.3)$$

$$x^4 + x^3 - x^2 - 2x - 2 = (3x^3 - x^2 - 6x)\left(\frac{1}{3}x + \frac{4}{9}\right) + \left(\frac{13}{9}x^2 + \frac{2}{3}x - 2\right) \quad (2.0.4)$$

$$3x^3 - x^2 - 6x = \left(\frac{13}{9}x^2 + \frac{2}{3}x - 2\right)\left(\frac{27}{13}x - \frac{117}{169}\right) + \left(-\frac{126}{169}x - \frac{558}{169}\right) \quad (2.0.5)$$