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$$11. \quad a_0x^{2n} + a_1x^{2n-1} + a_2x^{2n-2} + \dots + a_{2n}x^2 + a_{2n-1}x + a_{2n} = 0 \quad (a_0 \neq 0).$$

Reciprocal algebraic equation.

The substitution

$$y = x + \frac{1}{x} \tag{1}$$

leads to an algebraic equation of degree n .

Example. The equation

$$ax^6 + bx^5 + cx^4 + dx^3 + cx^2 + bx + a = 0 \tag{2}$$

is reduced to a cubic equation

$$ay^3 + by^2 + (c - 3a)y + d - 2b = 0$$

with the change of variable (1).

Reference

Encyclopedia of Mathematics, Vol. 1 [in Russian], Sovetskaya Entsiklopediya, Moscow, pp. 740–741, 1977.

Reciprocal Algebraic Equation

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