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Finding minimal polynomials of algebraic numbers of the form $\tan^2(\pi/n)$ using Tschirnhausen's transform

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Abstract

© 2016, Pleiades Publishing, Ltd.Solutions of two problems are proposed based on the Tschirnhausen transform. The first problem is connected with the construction of minimal polynomials of the numbers of the form tan2(π/n) by means of the Tschirnhausen transform for all natural n > 2. The second problem consists in finding the exact roots of the equation x3 − 7x − 7 = 0. A solution of the problem is obtained from the fact that the roots of the equation produce the cyclotomic field Q7. Examples of construction of minimal polynomials are provided.

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Keywords

algebraic numbers, cyclotomic fields and their subfileds, minimal polynomials, Tschirnhausen transform