

Re: Relationship between polynomial of Galois group "[2^4]E(4)" and a polynomial of degree 16.

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- *From:* Gerry <GerryMrt@xxxxxxxxxx>
 - *Date:* Fri, 21 Nov 2008 10:34:08 -0800 (PST)
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On Nov 21, 6:30 pm, Gerry <Gerry...@xxxxxxxxxx> wrote:

Hi all,

the irreducible polynomial P1 (see below) of degree 8 has Galois group : "[2^4]E(4)".

What is the Galois group of the irreducible polynomial P2 of degree 16?
Is there a relationship between the two Galois groups?

$$P1 = a8*x^8 + a7*x^7 + a6*x^6 + a5*x^5 + a4*x^4 + a3*x^3 + a2*x^2 + a1*x^1 + a0$$

coefficients of P1 with b,c in Q :

$$\begin{aligned} a0 &= 1 \\ a1 &= 0 \\ a2 &= 0 \\ a3 &= 0 \\ a4 &= c^4 \\ a5 &= 4 * c^3 * x \\ a6 &= 6 * c^2 * x^2 \\ a7 &= 4 * c * x^3 \\ a8 &= x^4 \end{aligned}$$

$$\begin{aligned} P2 &= a16*x^16 + a15*x^15 + a14*x^14 + a13*x^13 + a12*x^12 + a11*x^11 + \\ &a10*x^10 + a9*x^9 \\ &+ a8*x^8 + a7*x^7 + a6*x^6 + a5*x^5 + a4*x^4 + a3*x^3 + a2*x^2 + \\ &a1*x^1 + a0 \end{aligned}$$

coefficients of P2 with b,c in Q :

$$\begin{aligned} a0 &= 1 \\ a1 &= 0 \\ a2 &= 0 \\ a3 &= 0 \\ a4 &= - c^4 \\ a5 &= - 4 * c^3 * b \\ a6 &= - 6 * c^2 * b^2 \end{aligned}$$

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$$\begin{aligned}a_7 &= -4 * c * b^3 \\a_8 &= c^8 - b^4 \\a_9 &= 8 * c^7 * b \\a_{10} &= 28 * c^6 * b^2 \\a_{11} &= 56 * c^5 * b^3 \\a_{12} &= 70 * c^4 * b^4 \\a_{13} &= 56 * c^3 * b^5 \\a_{14} &= 28 * c^2 * b^6 \\a_{15} &= 8 * c * b^7 \\a_{16} &= b^8\end{aligned}$$

Regards

Gerry

Correction

coefficients of P1 with b,c in Q :

The P1 coefficients should be:

$$\begin{aligned}a_0 &= 1 \\a_1 &= 0 \\a_2 &= 0 \\a_3 &= 0 \\a_4 &= c^4 \\a_5 &= 4 * c^3 * b \\a_6 &= 6 * c^2 * b^2 \\a_7 &= 4 * c * b^3 \\a_8 &= b^4\end{aligned}$$

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