

> restart, read "/Users/heba/Desktop/Implementations/Absolute_Factorization.txt" :

> with(LREtools) :

 Env_LRE_tau := tau;

 Env_LRE_x := x;

 Env_LRE_tau := τ

 Env_LRE_x := x

(1)

> AbsFactorization($\tau^4 + \text{tau} + x$);

 true

(2)

> L := (16·x + 32)· τ^4 + (-16·x - 40)· τ^3 + (4·x + 12)· τ^2 - 2·(2·x + 3)·(x + 3)·(x + 2)
 · τ^1 - (x + 3)·(x + 1)·(x + 2)²·x;

L := (16x + 32) τ^4 + (-16x - 40) τ^3 + (4x + 12) τ^2 - 2 (2x + 3) (x + 3) (x + 2) τ - (x + 3) (x + 1) (x + 2)² x (3)

> AbsFactorization(L);

[2, { $\tau^2 + (-x - 2) \tau - (x + 2) (x + 1)^2 x$, $16 \tau^2 + (-16x - 24) \tau - (2x + 3)^2 (2x + 1)^2$ }] (4)

Trying the algorithm from section 3.3. This uses the Hom program:

> read "/Users/heba/Desktop/Implementations/Hom.txt" :

> AbsFactorization(L, 'Hom method');

[2, { $-\tau^2 + (x + 2) \tau + (x + 2) (x + 1)^2 x$, $16 \tau^2 + (-16x - 24) \tau - (2x + 3)^2 (2x + 1)^2$ }] (5)

OEIS A260772 example

> L := (x + 5)·(x + 4)·(25·x² + 130·x + 141)· τ^4 - 30·(x + 4)·(7·x + 13)· τ^3 + (-1100·x⁴
 - 12320·x³ - 48664·x² - 80740·x - 47400)· τ^2 + 120·(x + 6)·(x + 1)· τ - 16·(x + 1)
 ·(25·x² + 180·x + 296)·x;

L := (x + 5) (x + 4) (25 x² + 130 x + 141) τ^4 - 30 (x + 4) (7 x + 13) τ^3 + (-1100 x⁴ - 12320 x³ - 48664 x² - 80740 x - 47400) τ^2 + 120 (x + 6) (x + 1) τ - 16 (x + 1) (25 x² + 180 x + 296) x (6)

> AbsFactorization(L);

[2, {(2x + 5) (5x + 3) (x + 2) τ^2 + (-440 x³ - 1584 x² - 1780 x - 600) τ - 16 (5x + 8) (2x + 1) x, (2x + 5) (10x + 9) (x + 2) τ^2 + (-880 x³ - 3432 x² - 4220 x - 1650) τ - 16 (10x + 19) (2x + 1) x}] (7)

> AbsFactorization(L, 'Hom method');

[2, {(2x + 5) (5x + 3) (x + 2) τ^2 + (-440 x³ - 1584 x² - 1780 x - 600) τ - 16 (5x + 8) (2x + 1) x, -(2x + 5) (10x + 9) (x + 2) τ^2 + (880 x³ + 3432 x² + 4220 x + 1650) τ + 16 (10x + 19) (2x + 1) x}] (8)

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