```
> restart; read "/Users/hoeij/Downloads/Absolute_Factorization.txt" :
> with(LREtools) :
  _Env_LRE_tau := tau;
  _Env_LRE_x := x;
```

$$_Env\_LRE\_tau := \tau$$

$$_Env\_LRE\_x := x \tag{1}$$

```
> AbsFactorization(τ^4 + tau + x);
```

$$true \tag{2}$$

```
> 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;
```

$$L := (16x+32)\tau^4 + (-16x-40)\tau^3 + (4x+12)\tau^2 - 2(2x+3)(x+3)(x+2)\tau - (x+3)(x+1)(x+2)^2 x \tag{3}$$

```
> AbsFactorization(L);
```

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

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

```
> read "/Users/hoeij/Downloads/Hom.txt" :
> AbsFactorization(L, `Hom method`);
```

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

OEIS A260772 example

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

$$L := (x+5)(x+4)(25x^2+130x+141)\tau^4 - 30(x+4)(7x+13)\tau^3 + (-1100x^4 - 12320x^3 - 48664x^2 - 80740x - 47400)\tau^2 + 120(x+6)(x+1)\tau - 16(x+1)(25x^2+180x+296)x \tag{6}$$

```
> AbsFactorization(L);
```

$$\left[2, \left\{(2x+5)(5x+3)(x+2)\tau^2 + (-440x^3 - 1584x^2 - 1780x - 600)\tau - 16(5x+8)(2x+1)x,\ (2x+5)(10x+9)(x+2)\tau^2 + (-880x^3 - 3432x^2 - 4220x - 1650)\tau - 16(10x+19)(2x+1)x\right\}\right] \tag{7}$$

```
>
```