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fib_coprime_sfa  THM

⊢  ∀n:ℕ. CoPrime(fib(n),fib(n+1))
| by SimilarTo ∀n,k:ℕ. k = n+1 ⇒ CoPrime(fib(n),fib(k))
|
|\
| .....assertion .....
| ⊢  ∀n,k:ℕ. k = n+1 ∈ ℕ ⇒ CoPrime(fib(n),fib(k))
| | by Rewrite by
| |    Thm* ∀a,b:ℤ. CoPrime(a,b) ⟺ (∃x,y:ℤ. a·x+b·y = 1)
| |    {coprime_bezout_id}
| |    THEN
| |    NatInd Concl
| |
| |\
| | 1. k : ℕ
| | 2. k = 0+1 ∈ ℕ
| | ⊢  ∃x,y:ℤ. fib(0)·x+fib(k)·y = 1  by Compute ⌈fib(0)⌉ *⇒ 1
| | |
| | ⊢  ∃x,y:ℤ. 1·x+fib(k)·y = 1  by Witness: 1 | 0
| |
| .\
| . 1. n : ℤ
| . 2. 0<n
| . 3. ∀k:ℕ. k = n-1+1 ∈ ℕ ⇒ (∃x,y:ℤ. fib(n-1)·x+fib(k)·y = 1)
| . 4. k : ℕ
| . 5. k = n+1 ∈ ℕ
| . ⊢  ∃x,y:ℤ. fib(n)·x+fib(k)·y = 1
| . | by Compute
| . |      ⌈fib(k)⌉ *⇒ if k=₂0 ∨₂ k=₂1→ 1 else fib(k-1)+fib(k-2) fi
| . |    THEN
| . |    SplitOnConclITE
| . |    THEN
| . |    CBV: ∃a,b:ℤ. <prop>
| . |
| . 6. ¬k = 0
| . 7. ¬k = 1
| . ⊢  ∃a,b:ℤ. fib(n)·a+(fib(k-1)+fib(k-2))·b = 1
| . | by Rewrite by k-1 = n ∈ ℕ THEN Rewrite by k-2 = n-1 ∈ ℕ
| . |
| . ⊢  ∃a,b:ℤ. fib(n)·a+(fib(n)+fib(n-1))·b = 1
| . | by SimilarTo: ∃a,b:ℤ. fib(n-1)·b+fib(n)·(a+b) = 1
| . |
| . .....assertion .....
| . ⊢  ∃a,b:ℤ. fib(n-1)·b+fib(n)·(a+b) = 1  by Use:[n] Inst: Hyp:3
| . |
| . 8. ∃x,y:ℤ. fib(n-1)·x+fib(n)·y = 1
| . ⊢  ∃a,b:ℤ. fib(n-1)·b+fib(n)·(a+b) = 1
| .   by ExistHD Hyp:-1 THEN Witness: y-x | x
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. 1. n : ℤ
. 2. ∀k:ℕ. k = n+1 ∈ ℕ ⇒ CoPrime(fib(n),fib(k))
. ⊢  CoPrime(fib(n),fib(n+1))  by BackThru: Hyp:-1
END
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