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quot_rem_exists_n_sfa  THM

⊢  ∀a:ℕ, b:ℕ+. ∃q:ℕ, r:ℕb. a = q·b+r  by hold b constant
|
1. b : ℕ+
⊢  ∀a:ℕ. ∃q:ℕ, r:ℕb. a = q·b+r  by CompNatInd Concl
|
2. a : ℕ
3. ∀a1:ℕ. a1<a ⇒ (∃q:ℕ, r:ℕb. a1 = q·b+r)
⊢  ∃q:ℕ, r:ℕb. a = q·b+r  by Decide: a<b
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| 4. a<b
| ⊢  ∃q:ℕ, r:ℕb. a = q·b+r  by Witness: 0 | a
|
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. 4. ¬a<b
. ⊢  ∃q:ℕ, r:ℕb. a = q·b+r  by FwdThru: 3 on [ a-b<a ]
. |
. 5. ∃q:ℕ, r:ℕb. a-b = q·b+r
. ⊢  ∃q:ℕ, r:ℕb. a = q·b+r  by ExistHD Hyp:-1
. |
. 5. q : ℕ
. 6. r : ℕb
. 7. a-b = q·b+r
. ⊢  ∃q:ℕ, r:ℕb. a = q·b+r  by Witness: q+1 | r
. |
. ⊢  a = (q+1)·b+r  by Auto
END
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