```
factorial_tail_via_iter_step  THM

⊢  ∀m,k:ℕ.
|  1 ≤ m ≤ k ⇒ (∀k',m':ℕ. k' = k-1 ⇒ m' = m-1 ⇒ k!m = k•k'!m' ∈ ℕ)
| by Def of k!m
|
1. m : ℕ
2. k : ℕ
3. 1≤m
4. m≤k
5. k' : ℕ
6. m' : ℕ
7. k' = k-1
8. m' = m-1
⊢  (Π i:{k-m..k⁻}. i+1) = k•k'!m' ∈ ℕ
| by Rewrite by
|    Thm*  ∀f:(A→A→A), u:A, a,b:ℤ, e:({a..b⁻}→A).
|          a<b
|          ⇒
|          (Iter(f;u) i:{a..b⁻}. e(i))
|          =
|          f((Iter(f;u) i:{a..b-1⁻}. e(i)),e(b-1))
|    {iter_via_intseg_split_last} ...aℕ
|    THEN
|    Reduce Concl
|
⊢  (Π i:{k-m..k-1⁻}. i+1)•(k-1+1) = k•k'!m' ∈ ℕ
| by BackThru:
|    Thm*  ∀a,b,c,d:ℕ. a = b ⇒ c = d ⇒ a•c = d•b ∈ ℕ
|    {mul_nat_com} ...ℕ
|
⊢  (Π i:{k-m..k-1⁻}. i+1) = k'!m' ∈ ℕ  by Def of <nat>!<nat>
|
⊢  (Π i:{k-m..k-1⁻}. i+1) = (Π i:{k'-m'..k'⁻}. i+1) ∈ ℕ
  by Rewrite by k' = k-1 ...ℕ THEN Rewrite by m' = m-1 ...ℕ
END
```