



**Theorem 3** Any proof of  $\vdash F$  can be converted into a proof of  $\vdash^! F$ .

**Exercise 3 (Implementation)** Implement your proof in LF. Extend the following three type families by the new cases.

1. `ded: (hil F -> hil G) -> hil (F => G) -> type.`
2. `ndhil: nd F -> hil F -> type.`
3. `hilnd: hil F -> nd F -> type.`

Argue in each case why your implementation represents a proof.