Monotonic demonstranda and dummy introduction

When we have to prove

$$[f.exp]$$

for some exp and some <u>monotonic</u> f , it can help to know the following theorem

<u>Theorem</u> For monotonic f

(0) $[f.exp] \equiv \langle \forall z : [exp \Rightarrow z] : [f.z] \rangle$ and

(1) $[f.exp] \equiv \langle \exists z : [z \Rightarrow exp] : [f.z] \rangle$.

A reason to use (0) is that $[exp \Rightarrow z]$ is the form of expression in which we can manipulate exp . An example is given in EWD1118.

A reason to use (1) is that $[z \Rightarrow exp]$ is the form of conclusion we can draw about exp ; if it exists, the strongest z satisfying $[f.z]$ is a good candidate for a witness. An example is given in EWD1116.

This theorem is very simple, very general and probably equally applicable and useful. Why did it take me a lifetime to formulate it?

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