

Monotonic demonstranda and dummy introduction

When we have to prove

$$[f.exp]$$

for some exp and some monotonic f , it can help to know the following theorem

Theorem For monotonic f

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

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

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?

Austin, 1 December 1991

prof. dr. E.W. Dijkstra, CS Dept., UT, Austin TX 78712-1188