Proof of Theorem 130

The theorem to be proved is

1 is a power of two

Suppose the theorem does not hold. Then, with the variables held fixed,

(H) [[¬ (1) is a power of two]]

Special cases of the hypothesis and previous results:

0: ¬ 1 is a power of two from H

1: 1 is a power of two ∨ $\neg\, 0 \leq 1$ ∨ $\neg\, 2 \uparrow 0 = 1$ from 129$^{<-}$;1;0

2: $0 \leq 2 \uparrow 0$ from 128;0

3: $2 \uparrow 0 = 1$ from 126;2

Equality substitutions:

4: $\neg\, 2 \uparrow 0 = 1$ ∨ $\neg\, 0 \leq 2 \uparrow 0$ ∨ $0 \leq 1$

Inferences:

5: $\neg\, 0 \leq 1$ ∨ $\neg\, 2 \uparrow 0 = 1$ by
0: ¬ 1 is a power of two
1: 1 is a power of two ∨ $\neg\, 0 \leq 1$ ∨ $\neg\, 2 \uparrow 0 = 1$

6: $\neg\, 2 \uparrow 0 = 1$ ∨ $0 \leq 1$ by
2: $0 \leq 2 \uparrow 0$
4: $\neg\, 2 \uparrow 0 = 1$ ∨ $\neg\, 0 \leq 2 \uparrow 0$ ∨ $0 \leq 1$

7: $\neg\, 0 \leq 1$ by
3: $2 \uparrow 0 = 1$
5: $\neg\, 0 \leq 1$ ∨ $\neg\, 2 \uparrow 0 = 1$

8: $0 \leq 1$ by
3: $2 \uparrow 0 = 1$
6: $\neg\, 2 \uparrow 0 = 1$ ∨ $0 \leq 1$

9: QEA by
7: $\neg\, 0 \leq 1$
8: $0 \leq 1$