

1: $J \cdot H = \text{id}, H \cdot F = H \cdot G$ assumptions

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2: $J \cdot H \cdot G = G$

3: $J \cdot (H \cdot G) = G$

Associativity 2

4: $J \cdot (H \cdot F) = G$

Fold with hypothesis 1.2,3

5: $J \cdot H \cdot F = G$

Associativity 4

6: $\text{id} \cdot F = G$

Unfold with hypothesis 1.1,5

7: $F = G$

Fold using Conjecture $F = \text{id} \cdot F$ 6