

What's wrong with the following proposed inference rule?

Let P be a common subformula of goal \mathcal{G}_1 and goal \mathcal{G}_2 , occurring at least once in each of these formulas. Then

From goal \mathcal{G}_1 and goal \mathcal{G}_2
derive goal $\mathcal{G}_1[P \mapsto \text{False}] \vee \mathcal{G}_2[P \mapsto \text{True}]$

(This is similar to, but not the same as, GG-resolution.)

Answer: Consider the tableau

g1. P given
g2. P given

This tableau is not valid.

If we apply the proposed inference rule, we obtain

g1. P given
g2. P given
g3. $\text{false} \vee \text{true}$ g1,g2, proposed rule

which is a valid tableau since (g3) rewrites to **true**.

Therefore, the proposed rule can transform an invalid tableau into a valid tableau. Such a rule therefore cannot show that the given, starting tableau, must be valid, if the resulting tableau is valid.