

## 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.