· $h = (f \vee p) \wedge (g \vee \neg p)$ satisfiable iff $(f \vee g)$ satisfiable.

($\Rightarrow$) Suppose not true, i.e., both f and g not satisfiable.

     Choose $p = $ TRUE. Then $f \vee p = $ TRUE, but $g \vee \neg p \equiv$ FALSE

                     So, $h \equiv$ FALSE

     Choose $p = $ FALSE. Then $g \vee \neg p = $ TRUE, but $f \vee p \equiv$ FALSE

                     So, $h \equiv$ FALSE

     Thus h not satisfiable, a contradiction.

($\Leftarrow$) Suppose f is satisfiable, then $f \vee p$ satisfiable for any p.
     Set $p = $ FALSE, then $g \vee \neg p \equiv$ TRUE. So $h = (f \vee p)$, which is satisfiable.

     Similarly if g is satisfiable, then $g \vee \neg p$ satisfiable for any p.
     Choose $p = $ TRUE, then $f \vee p \equiv$ TRUE. So $h \equiv g \vee \neg p$, which is satisfiable.

Example: $\{p, q\}$ $\{\neg p, \neg q\}$ $\{\neg q, r, t\}$ $\{q, \neg r, t\}$ $\{q, r, \neg t\}$ $\{\neg q, \neg r, \neg t\}$
               $\{\neg r, s\}$ $\{r, \neg s\}$ $\{\neg p, s, t\}$, $\{p, \neg s, t\}$ $\{p, s, \neg t\}$ $\{\neg p, \neg s, \neg t\}$

resolve wrt p: $\{q, \neg q\}$ $\{q, s, t\}$ $\{q, \neg s, \neg t\}$ $\{\neg q, \neg s, t\}$ $\{\neg q, s, \neg t\}$ $\{s, t, \neg s, t\}$
               $\{s, t, \neg s, t\}$ $\{\neg s, t, \neg s, \neg t\}$ $\{s, \neg t, \neg s, \neg t\}$ $\{\neg q, r, t\}$ $\{q, \neg r, t\}$ $\{q, r, \neg t\}$
               $\{\neg q, \neg r, \neg t\}$ $\{\neg r, s\}$ $\{r, \neg s\}$

resolve wrt q: $\{s, t, \neg s, t\}$ $\{s, t, s, t\}$ $\{s, t, r, t\}$ $\{s, t, \neg r, \neg t\}$ $\{\neg s, \neg t, \neg s, t\}$ $\{\neg s, \neg t, s, \neg t\}$
               $\{\neg s, \neg t, r, t\}$ $\{\neg s, \neg t, \neg r, \neg t\}$ $\{\neg s, t, \neg r, t\}$ $\{\neg s, t, r, t\}$ $\{r, t, \neg r, t\}$ $\{r, t, r, \neg t\}$
               $\{s, t, r, t\}$ $\{s, \neg s, \neg t\}$ $\{\neg r, t, \neg r, \neg t\}$ $\{r, \neg t, r, \neg t\}$ $\{\neg r, s\}$ $\{r, \neg s\}$

resolve wrt r: $\{s, t, \neg s, \neg t\}$ $\{s, t, \neg s, t\}$ $\{s, t, s\}$ $\{\neg s, \neg t, \neg s\}$ $\{\neg s, t, \neg s\}$
               $\{\neg s, \neg t, s, \neg t\}$ $\{\neg s, t, s, \neg t\}$ $\{s, \neg t, s\}$

resolve wrt s: $\{t, \neg t\}$ $\{t\}$ $\{\neg t\}$ $\{t, \neg t\}$

resolve wrt t: $\{\}$ So $\sqrt{\text{satisfiable}}$ **not**   satisfiable!