

Getting used to LTL ...

Express in natural language: $FG p$ $GF p$

Are these pairs of formulas equivalent?

$FF p$ Fp
 $FG p$ $GF p$
 $p U q$ $p U (p \wedge q)$

GGp Gp
 $FGF p$ $GF p$

Fp $p \vee XF p$
 Gp $p \vee XG p$

Fp $p \wedge XF p$
 Gp $p \vee GF p$

$p U q$ $p \vee X(p U q)$ $p U q$ $p \wedge X(p U q)$
 $p U q$ $q \vee X(p U q)$ $p U q$ $q \wedge X(p U q)$
 $p U q$ $q \vee (p \wedge X(p U q))$ $p U q$ $q \wedge (p \vee X(p U q))$