$$\mathtt{X}\,\varphi \overset{\mathtt{dsc}}{\equiv} (sing \,\wedge\, \mathtt{X}\,(\varphi)) \,\vee\, (\neg sing \,\wedge\, (\varphi))$$

$$\overset{\mathtt{t}}{\equiv} (sing \,\wedge\, \mathtt{X}\,(\boxed{\varphi} \,\wedge\, alive)) \,\vee\, (\neg sing \,\wedge\, \boxed{\varphi})$$

$$\varphi_1\,\mathtt{U}\,\varphi_2 \overset{\mathtt{dsc}}{\equiv} \varphi_1\,\mathtt{U}\,(\varphi_2 \,\wedge\, (\varphi_1 \,\vee\, sing))$$

$$\overset{\mathtt{t}}{\equiv} \boxed{\varphi_1}\,\mathtt{U}\,(\boxed{\varphi_2} \,\wedge\, (\boxed{\varphi_1} \,\vee\, sing) \,\wedge\, alive))$$

$$\mathtt{F}\,\varphi \equiv true\,\mathtt{U}\,\varphi$$

$$\overset{\mathtt{dsc}}{\equiv} true\,\mathtt{U}\,(\varphi \,\wedge\, (true \,\vee\, sing))$$

$$\equiv true\,\mathtt{U}\,\varphi$$

$$\overset{\mathtt{t}}{\equiv} true\,\mathtt{U}\,(\varphi \,\wedge\, alive)$$

$$\equiv \mathtt{F}\,(\boxed{\varphi} \,\wedge\, alive)$$

$$\mathtt{G}\,\varphi \equiv \neg\mathtt{F}\neg\varphi$$

$$\overset{\mathtt{dsc}}{\equiv} \neg\mathtt{F}\,(\neg\varphi \,\wedge\, alive)$$

$$\equiv \mathtt{G}(\boxed{\varphi} \,\vee\, \neg alive)$$

$$\varphi_1\,\mathtt{W}\,\varphi_2 \equiv (\varphi_1\,\mathtt{U}\,\varphi_2) \,\vee\, \mathtt{G}\,\varphi_1$$

$$\overset{\mathtt{dsc,t}}{\equiv} \boxed{\varphi_1}\,\mathtt{U}\,(\boxed{\varphi_2} \,\wedge\, (\boxed{\varphi_1} \,\vee\, sing) \,\wedge\, alive)) \,\vee\,$$
$$\mathtt{G}(\boxed{\varphi_1} \,\vee\, \neg alive)$$

$$\varphi_1\,\mathtt{R}\,\varphi_2 \overset{\mathtt{n}}{\equiv} \neg(\neg\varphi_1\,\mathtt{U}\,\neg\varphi_2)$$

$$\overset{\mathtt{dsc}}{\equiv} \neg(\neg\varphi_1\,\mathtt{U}\,(\neg\varphi_2 \,\wedge\, (\neg\varphi_1 \,\vee\, sing)))$$

$$\overset{\mathtt{t}}{\equiv} \neg(\neg\,\varphi_1\,\mathtt{U}\,(\neg\,\varphi_2 \,\wedge\, (\neg\,\varphi_1 \,\vee\, sing) \,\wedge\, alive))$$

$$\equiv \boxed{\varphi_1}\,\mathtt{R}\,(\boxed{\varphi_2} \,\vee\, (\boxed{\varphi_1} \,\wedge\, \neg sing) \,\vee\, \neg alive)$$

$$\varphi_1\,\mathtt{M}\,\varphi_2 \equiv \varphi_1\,\mathtt{R}\,\varphi_2 \,\wedge\, \mathtt{F}(\varphi_1 \,\wedge\, \varphi_2)$$

$$\overset{\mathtt{dsc,t}}{\equiv} (\boxed{\varphi_1}\,\mathtt{R}\,(\boxed{\varphi_2} \,\vee\, (\boxed{\varphi_1} \,\wedge\, \neg sing) \,\vee\, \neg alive)) \,\wedge\,$$
$$\mathtt{F}\,(\boxed{\varphi_1} \,\wedge\, \boxed{\varphi_2} \,\wedge\, alive)$$

Non necessario

$$\varphi_1 \, \mathtt{S} \, \varphi_2 \stackrel{\mathtt{dsc}}{\equiv} (sing \, \wedge \, \mathtt{X} \, (\varphi_1 \, \mathtt{U} \, \varphi_2)) \vee (\neg sing \, \wedge \, (\varphi_1 \, \mathtt{U} \, \varphi_2))$$

$$\stackrel{\mathtt{t}}{\equiv} (sing \, \wedge \, \mathtt{X} \, ((\varphi_1 \mathtt{U} \, \varphi_2) \wedge alive)) \vee (\neg sing \, \wedge \, (\varphi_1 \mathtt{U} \, \varphi_2))$$

$$\stackrel{\mathtt{dsc,t}}{\equiv} (sing \, \wedge \, \mathtt{X} \, ((\boxed{\varphi_1} \mathtt{U} \, (\boxed{\varphi_2} \wedge \, (\boxed{\varphi_1} \vee sing) \, \wedge \, alive)) \wedge alive)) \vee$$

$$(\neg sing \, \wedge \, (\boxed{\varphi_1} \mathtt{U} \, (\boxed{\varphi_2} \wedge \, (\boxed{\varphi_1} \vee sing) \, \wedge \, alive)))$$