



variable $\{x, y\}$

free variables $\{x, y\}$

bound variable $\{x\}$

$$\forall x. \exists y. \exists z. (R(y, z) \vee \underbrace{(R(x, y) \rightarrow P(y))}_{\text{Remaining}})$$

Remaining fresh Q {x, y} Remaining

$$\forall x \exists y \exists z (R(y, z) \vee \neg Q(x, y)) \wedge$$

$$\forall x \forall y (R(x, y) \rightarrow P(y)) \rightarrow Q(x, y)$$

M $\Rightarrow \forall x \exists y \exists z (R(y, z) \vee \neg Q(x, y)) \wedge$

$$\forall x \forall y ((R(x, y) \wedge \neg P(y)) \vee Q(x, y))$$

main $\Rightarrow \forall x' (R(g(x'), f(x')) \vee \neg Q(x', g(x')))$
 shows $\forall x \forall y ((R(x, y) \wedge \neg P(y)) \vee Q(x, y))$

$$\forall x \exists y. R(x, y)$$

$$\Delta = \{y \rightarrow x\}$$



$$\forall x \exists y. R(x, x) \quad \text{not on } \Delta \text{ or equiv preserving}$$

$$\Delta(\exists y R(x, y))$$

$$\Rightarrow (\exists y' [R(x, y') \wedge \Delta(x \rightarrow x', y' \rightarrow y)])$$

$$\Rightarrow (\exists y' [R(x', y')])$$

$$\forall x \exists y \exists z (R(y, z) \vee \neg Q(x, y)) \wedge \forall x \forall y ((R(x, y) \wedge P(y)) \vee Q(x, y)) \wedge \Phi$$

$$\stackrel{M_i}{\Rightarrow} \forall x \exists y (\exists z (R(y, z) \vee \neg Q(x, y)) \wedge \Phi)$$

$$\stackrel{M_i}{\Rightarrow} \forall x (\underbrace{\exists y \exists z (R(y, z) \vee \neg Q(x, y))}_{\text{true}} \wedge \Phi)$$

$$\stackrel{M_i}{\Rightarrow} [\underbrace{(\exists y \exists z (R(y, z) \vee \neg Q(x, y)))}_{\text{true}} \wedge \Phi]$$

$$\stackrel{situation}{\Rightarrow} [\underbrace{R(a, b)}_{\text{true}} \vee \forall x \neg Q(x, f(x))] \wedge \Phi$$

$$N_0 = \{ P(a) \vee P(x) \vee P(g(x)) \vee \neg P(a) \}$$

$$N_0 \vdash N_0 \vee \{ P(g(a)) \} \vdash N_1 \vee \{ P(g(g(a))) \}$$

$$\vdash \dots$$