k-29

1. ③ $\forall x\,((P(x) \wedge \neg Q(x)) \to \exists y\,(R(x,y) \wedge G(y)))$ $\quad P(x) \wedge \neg Q(x)$

$\overline{P}(x) \vee Q(x)$

$\forall x\,((\overline{P}(x) \vee Q(x)) \vee \exists y\,(R(x,y) \wedge G(y)))$

$\forall x\,\exists y\,((\overline{P}(x) \vee Q(x)) \vee (R(x,y) \wedge G(y)))$

$\forall x\,\exists y\,((\overline{P}(x) \vee Q(x) \vee R(x,y)) \wedge (\overline{P}(x) \vee Q(x) \vee G(y)))$ (1)

2. $\forall x\,(S(x) \to \neg Q(x))$ $\quad \forall x\,(S(k) \vee \overline{Q}(k))$ (2)

$\forall x\,(\overline{S}(x) \vee \overline{Q}(x))$

3. $\exists x\,(S(x) \wedge (P(x) \wedge \forall x\,(R(x,y) \to S(y))))$

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

$\exists x\,(S(x) \wedge P(x) \wedge (\neg R(z,c) \vee S(c)))$

$\exists x\,\forall z\,(S(x) \wedge P(x) \wedge (\neg R(z,c) \vee S(c)))$

$\exists x\,\forall z\,(S(x) \wedge P(x) \wedge (\neg R(z,c) \vee S(c)))$ (3)

4. $\exists y\,\{\forall k\,\exists x\,\forall z\,((1) \wedge (2) \wedge (3))$

$y = f(x)$, $x = g(x,k)$

$S = \{\overline{P}(x) \vee Q(x) \vee R(x, f(x)),\ \overline{P}(x) \vee Q(x) \vee G(f(x)),\ \overline{S}(k) \vee \overline{Q}(k),\ \overline{R}(z,c) \vee S(c),\ S(g(x,k)),\ P(g(x,k)) \}$

$E = \{c, f(c), f(\ldots$

② $\neg P, \neg Q \vdash \ldots$

1. $\neg P, \neg Q \ldots$

$E \to \{ c, f(c), f(f(c)), \ldots, g(c,d) \}$

2 $\neg P, \neg Q \vdash P \to Q$

1. $\neg P, \neg Q \vdash P \to Q$ за [illegible]