$G_1.$

a) $A(\beta) (s(x) + y + s(x))$

$$s(x) = xx$$
$$y \to y$$
$$s(x) \to xx$$

$\Rightarrow A(\beta) (xxyxx) = bababbaba$ $\quad \|^b \quad^a$
$\qquad \qquad \qquad \qquad \qquad \|^{ba} \quad \|$

b) $A(\beta)(x = y + 0) \Rightarrow \beta(x) = \beta(y) + 0_A$
$$ba = b + a$$
$$ba = ba \Rightarrow True$$

c) $A(\beta)(\exists x \forall y (x + y = s(x) + y))$

$$\max_{w_1} \min_{w_2} (w_1 w_2 = w_1 w_1 w_2)$$

Für $w_1 = \mathcal{E}$ es Not möglich $\Rightarrow$ True

d) $A(\beta) (\exists y p (x+y))$ ; $\beta(x) = ba$ ; $\beta(y) = b$

$$\max_{w_1} (p(w_2 + w_1))$$
$$\max_{w_1} (p(w_2 w_1)) \Rightarrow False, \text{ weil } w_1 \text{ „a" nidet}$$
$$\qquad \qquad \qquad \qquad \qquad \text{enthält}$$

e) $A(\beta)(\forall x \forall y ((p(x) \land \neg p(y)) \to p(x+y)))$

$$p(x) = p(ba) = \bot \qquad \qquad 1 \to 0 \quad (Falo)$$
$$p(y) = p(b) = \top \qquad \qquad 1 \to 1 \quad (wahr)$$
$$p(x+y) = p(bab) = \bot \qquad 0 \to 1 \quad (wahr)$$
$$\qquad \qquad \qquad \qquad \qquad 0 \to 0 \quad (wahr)$$

$$\min_{w_1} \min_{w_2} ((p(w_1) \land \neg p(w_2)) \to p(w_1 + w_2))$$

$$\Rightarrow True$$

$G_2.$

a) $A(\beta)(p(1) + p(p(x) + 0))$

$\underline{I} \quad \beta = \beta_1$

$A(\beta_1)(p(1) + p(p(x) + 0_A))$

$$p(0) = -1$$
$$p(x) = p(\beta(x)) = p(7) = 6$$
$$p(x) + 0_A = p(x) + 1 = 6 + 1 = 7$$
$$p(7) = 6$$
$$p(0) + p(7) = -1 + 6 = 5$$

$$A(\beta)(p(1) + p(p(x) + 0)) = 6$$

$$A(\beta)\,(p(1) + p(p(x) + 0)) = b$$

I $\beta = \beta_2$

$\#$

$$A(\beta_2)\,(p(1) + p(p(x) + 0))$$

$$A(\beta_2)\,(p(0) + p(p(p(x)) + 1))$$

$$A(\beta_2)\,(p(0) + p(-1 + 1))$$

$$A(\beta_2)\,(p(0) + p(0))$$

$$A(\beta_2)\,(-1 - 1)$$

$$A(\beta_2)\,(-2)$$

b) $A(\beta)\,(x + 0_A = p(y) + p(u))$

I $\beta = \beta_1$

$\#$

$$A(\beta_1)\,(x + 1 = p(y) + p(0))$$

$$A(\beta_1)\,(x + 1 = p(\beta_1(y)) - 1)$$

$$A(\beta_1)\,(x + 1 = p(5) - 1)$$

$$A(\beta_1)\,(\beta_1(x) + 1 = 3)$$

$$A(\beta_1)\,(7 + 1 = 3)$$

$$A(\beta_1)\,(8 = 3) \qquad \Rightarrow Falsum$$

II $\beta = \beta_2$

$\#$

$$A(\beta_2)\,(x + 0_A = p(y) + p(u))$$

$$A(\beta_2)\,(\beta_2(x) + 1 = p(\beta_2(y)) + p(0))$$

$A(\beta_2) \ (\beta_2(x) + 1 = p(\beta_2(y)) + p(0))$

$A(\beta_2) \ (0 + 1 = p(3) + p(0))$

$A(\beta_2) \ (1 = 2 - 1)$

$A(\beta_2) \ (1 = 1) \quad \Rightarrow True$

c) $A(\beta) \ (p(0) + p(0) = p(p(0)))$

I $\beta = \beta_1$

$\#$

$A(\beta_1) \ (p(0_A) + p(0_A) = p(p(0_A)))$

$A(\beta_1) \ (p(1) + p(1) = p(p(1)))$

$A(\beta_1) \ (0 + 0 = p(0))$

$A(\beta_1) \ (0 = -1) \quad \Rightarrow Falsum$

II $\beta = \beta_2$

$\#$

$A(\beta_2) \ (p(0_A) + p(0_A) = p(p(0_A)))$

$\Rightarrow Falsum$

6g.

a) $A(\beta) \ (S(S(x) * 1 * y))$

$A(\beta) \ (S(S(\beta(x)) * 1 * \beta(y)))$

$A(\beta) \ (S(S(11) * 1 * 7))$

$A(\beta) \ (S(12 * 1 * 7))$

$$A(\beta)\,(\,5(12 \not{*} 9 \not{*} 7)\,)$$

$$A(\beta)\,(5(12 \not{*} 9 \not{*} 7)\,)$$

$$A(\beta)\,(\,5(20))$$

$$A(\beta)\,(21)$$

b) $A(\beta)\,(\,5(x\not{*}y) = 5(x)\not{*}1)$

$\#$

$$A(\beta)\,(\,5(\beta(x)\not{*}\beta(y))\,) = 5(\beta(x)\not{*}1)$$

$$A(\beta)\quad(5(11\not{*}7) = 5(11)\not{*}1)$$

$$A(\beta)\quad(\,5(12) = 12\not{*}1)$$

$$A(\beta)\quad(19 = 13\,) \;\Rightarrow \text{Falsum}$$

c) $A(\beta)\,(\forall x \forall y\,(\,5(x\not{*}y) = 5(x)\not{*}y))$

$\#$

$$A(\beta)\,(\,\forall x \forall y\,(\,5(\beta(x)\not{*}\beta(y)) = 5(\beta(x))\not{*}\beta(y))$$

$$\text{pentru } x \text{ mai ales } y\,(\,x+y+1 = x+1+y\,) \Rightarrow \text{Wahr}$$

$$y+1 - \text{operatie pe } \mathbb{R}$$

d) $A(\beta)\,(\exists y\, p(y\not{*}x))$

$\#$

$$A(\beta)\,(\,\exists y\; p(\beta(y)\not{*}\beta(x)))$$

$H(\beta)\ (\exists y\ \ P\ (B(y) * B(x)))$

$max\ y\ (\ \rho(x+y)\ )\quad \Rightarrow walu$

e) $A(\beta)\ ((\forall x\ \exists y\ ((x = y+1\ \land \neg\rho(x)) \rightarrow \rho(y))$

$\Rightarrow True$

$x+1 = y$

$q$

$,hupa$

$q\ pin$

BOGDAN TODIRAS

TUDOR MIHAI VISAN

VALER SZABO

TUDOR GABRIEL NICOLAESCU

FRANCISC TULICI

POSTESCU RAZVAN