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1   m1 Theory

Built: 02 April 2019
Parent Theories: sm

1.1   Datatypes

command = i0 | i1

output = o0 | o1

state = S0 | S1 | S2

1.2   Theorems

[command_distinct_clauses]

$\vdash$ i0 $\neq$ i1

[m1_rules]

$\vdash$ ($\forall$ *ins* *outs*.
    TR i0 (CFG (i0::*ins*) S0 *outs*) (CFG *ins* S1 (o0::*outs*))) $\wedge$
($\forall$ *ins* *outs*.
    TR i1 (CFG (i1::*ins*) S0 *outs*) (CFG *ins* S2 (o1::*outs*))) $\wedge$
($\forall$ *ins* *outs*.
    TR i0 (CFG (i0::*ins*) S1 *outs*) (CFG *ins* S0 (o0::*outs*))) $\wedge$
($\forall$ *ins* *outs*.
    TR i1 (CFG (i1::*ins*) S1 *outs*) (CFG *ins* S0 (o0::*outs*))) $\wedge$
($\forall$ *ins* *outs*.
    TR i0 (CFG (i0::*ins*) S2 *outs*) (CFG *ins* S2 (o1::*outs*))) $\wedge$
$\forall$ *ins* *outs*.
  TR i1 (CFG (i1::*ins*) S2 *outs*) (CFG *ins* S2 (o1::*outs*))

[M1ns_def]

$\vdash$ (M1ns S0 i0 = S1) $\wedge$ (M1ns S0 i1 = S2) $\wedge$ (M1ns S1 i0 = S0) $\wedge$
(M1ns S1 i1 = S0) $\wedge$ (M1ns S2 i0 = S2) $\wedge$ (M1ns S2 i1 = S2)

[M1ns_ind]

$\vdash$ $\forall$ *P*.
    P S0 i0 $\wedge$ *P* S0 i1 $\wedge$ *P* S1 i0 $\wedge$ *P* S1 i1 $\wedge$ *P* S2 i0 $\wedge$ *P* S2 i1 $\Rightarrow$
    $\forall$ *v* v_1. *P* *v* v_1

[M1out_def]

$\vdash$ (M1out S0 i0 = o0) $\wedge$ (M1out S0 i1 = o1) $\wedge$
(M1out S1 i0 = o0) $\wedge$ (M1out S1 i1 = o0) $\wedge$
(M1out S2 i0 = o1) $\wedge$ (M1out S2 i1 = o1)

[M1out_ind]

$\vdash \forall P.$
  P S0 i0 $\land$ P S0 i1 $\land$ P S1 i0 $\land$ P S1 i1 $\land$ P S2 i0 $\land$ P S2 i1 $\Rightarrow$
  $\forall v\ v_1.\ P\ v\ v_1$

[m1TR_clauses]

$\vdash (\forall x\ x1s\ s_1\ out1s\ x2s\ out2s\ s_2.$
    TR x (CFG $x1s\ s_1\ out1s$) (CFG $x2s\ s_2\ out2s$) $\iff$
    $\exists NS\ Out\ ins.$
      $(x1s\ =\ x::ins)\ \land\ (x2s\ =\ ins)\ \land\ (s_2\ =\ NS\ s_1\ x)\ \land$
      $(out2s\ =\ Out\ s_1\ x::out1s))\ \land$
  $\forall x\ x1s\ s_1\ out1s\ x2s\ out2s.$
    TR x (CFG $x1s\ s_1\ out1s$)
      (CFG $x2s$ (M1ns $s_1\ x$) (M1out $s_1\ x::out2s$)) $\iff$
    $\exists ins.\ (x1s\ =\ x::ins)\ \land\ (x2s\ =\ ins)\ \land\ (out2s\ =\ out1s)$

[m1TR_rules]

$\vdash \forall s\ x\ ins\ outs.$
    TR x (CFG $(x::ins)\ s\ outs$)
      (CFG ins (M1ns $s\ x$) (M1out $s\ x::outs$))

[m1Trans_Equiv_TR]

$\vdash$ TR x (CFG $(x::ins)\ s\ outs$)
    (CFG ins (M1ns $s\ x$) (M1out $s\ x::outs$)) $\iff$
  Trans $x\ s$ (M1ns $s\ x$)

[output_distinct_clauses]

$\vdash$ o0 $\neq$ o1

[state_distinct_clauses]

$\vdash$ S0 $\neq$ S1 $\land$ S0 $\neq$ S2 $\land$ S1 $\neq$ S2

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