Report on Identification

Generated by MTT using :
(mtt -u -q -q Identification rep pdf)

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Part I

Identification

Chapter 1

idNonlinearTanks

1.1 idNonlinearTanks_abg.tex

MTT command:

```
mtt idNonlinearTanks abg tex
```

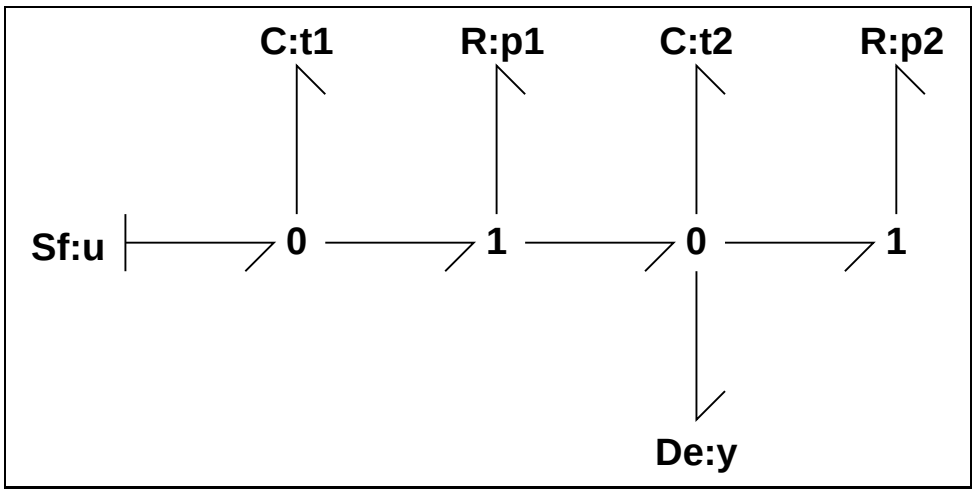

Figure 1.1: System **idNonlinearTanks**: acausal bond graph

The acausal bond graph of system **idNonlinearTanks** is displayed in Figure 2.1 (on page 21) and its label file is listed in Section 2.1.1 (on page 22). The subsystems are listed in Section 2.1.2 (on page 23).

This example illustrates the sensitivity approach to model-based system identification[1].

[1]Peter J Gawthrop, *Sensitivity Bond Graphs*, Journal Franklin Institute, **337**, 2000, pp 907–922

The system compprises two non-linear tanks (see the paper for details). The method identifies four parameters: the two initial states ans the two parameters of the non-linear flow resistance.

To see the results, type:

```
mtt -oct -i euler -pdf idNonlinearTanks ippp view
```

1.1.1 Summary information

System NonlinearTanks: ¡Detailed description here¿

Interface information:

This component has no ALIAS declarations

Variable declarations:

This component has no PAR declarations

Units declarations:

This component has no UNITs declarations

The label file: idNonlinearTanks_lbl.txt

```
%% Label file for system idNonlinearTanks (NonlinearTanks_lbl.txt)
%SUMMARY NonlinearTanks
%DESCRIPTION <Detailed description here>

% %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% %% Version control history
% %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% %% $Id: idNonlinearTanks_lbl.txt,v 1.1 2001/04/05 12:00:18 gawth
% %% $Log: idNonlinearTanks_lbl.txt,v $
% %% Revision 1.1  2001/04/05 12:00:18  gawthrop
% %% Identification example
% %%
% %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%


% Component type C
t1 conical rho,g,V_1
```

```
t2 conical rho,g,V_2

% Component type R
p1 discharge alpha,beta
p2 discharge alpha,beta

% Component type Sf
        u SS external

% Component type De
        y SS external
```

1.1.2 Subsystems

- De Simple effort detector (1) No subsystems.
- Sf Simple flow source (1) No subsystems.

1.1.3 De

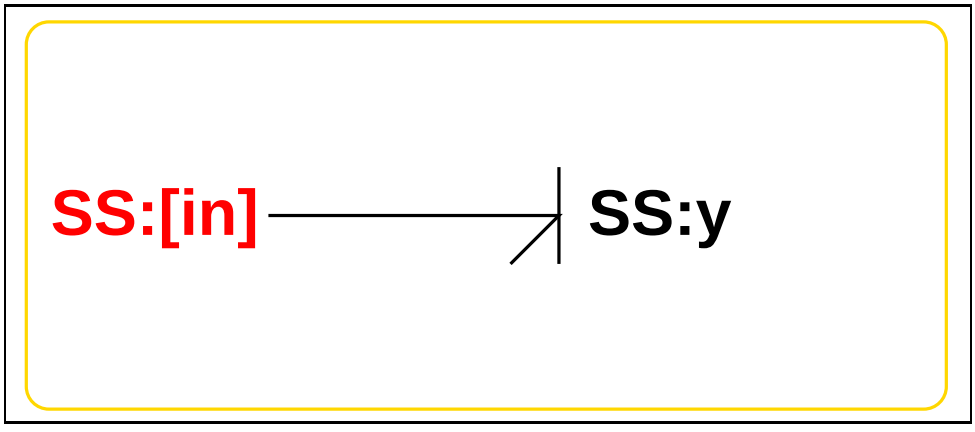

Figure 1.2: System **De**: acausal bond graph

The acausal bond graph of system **De** is displayed in Figure 2.2 (on page 24) and its label file is listed in Section 2.1.3 (on page 24). The subsystems are listed in Section 2.1.3 (on page 26).

Summary information

System De:Simple effort detector Simple effort detector constructed from SS with fixed causality

Interface information:

Parameter $1 represents actual parameter **external**

Port in represents actual port **in**

Port out represents actual port **in**

Variable declarations:

This component has no PAR declarations

Units declarations:

This component has no UNITs declarations

The label file: De_lbl.txt

```
%% Label file for system De (De_lbl.txt)
%SUMMARY De Simple effort detector
%DESCRIPTION Simple effort detector constructed from SS with fixed

% %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% %% Version control history
% %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% %% $Id: De_lbl.txt,v 1.4 2002/11/07 04:28:23 gawthrop Exp $
% %% $Log: De_lbl.txt,v $
% %% Revision 1.4  2002/11/07 04:28:23  gawthrop
% %% Now has argument - either internal or external
% %%
% %% Revision 1.3  1999/09/07 03:32:21  peterg
% %% Fixed alias bug
% %%
% %% Revision 1.2  1999/09/07 03:21:02  peterg
% %% Aliased to out as well as in
% %%
% %% Revision 1.1  1999/03/03 22:02:04  peterg
```

```
% %% Initial revision
% %%
% %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%


% Port aliases
%ALIAS in|out in

% Argument aliases
%ALIAS $1 external

%% Each line should be of one of the following forms:
%       a comment (ie starting with %)
%       component-name cr_name arg1,arg2,..argn
%       blank

% ---- Component labels ----

% Component type SS
[in] SS external,external
y SS external,0
```

Subsystems

No subsystems.

1.1.4 Sf

The acausal bond graph of system **Sf** is displayed in Figure 1.3 (on page 14) and its label file is listed in Section 1.1.4 (on page 13). The subsystems are listed in Section 1.1.4 (on page 15).

Summary information

System Sf:Simple flow source Simple flow source constructed from SS with fixed causality

Interface information:

Parameter $1 represents actual parameter **f_s**

Port in represents actual port **out**

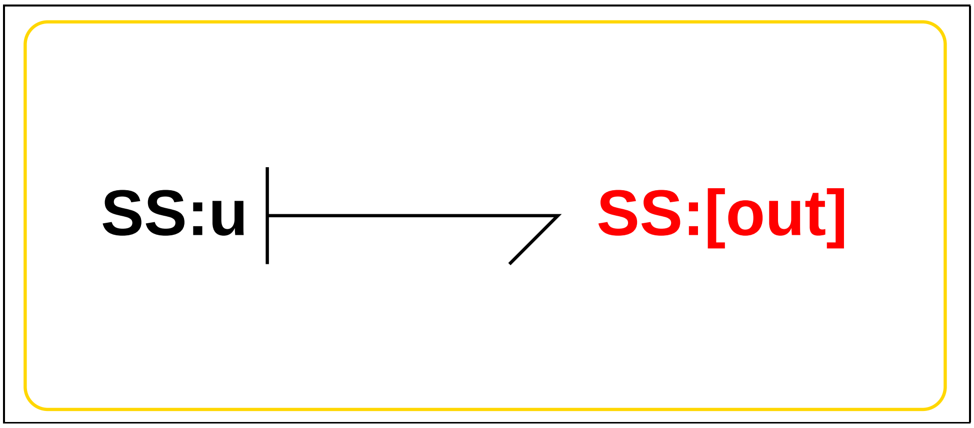

Figure 1.3: System **Sf**: acausal bond graph

Port out represents actual port **out**

Variable declarations:

This component has no PAR declarations

Units declarations:

This component has no UNITs declarations

The label file: Sf_lbl.txt

```
%% Label file for system Sf (Sf_lbl.txt)
%SUMMARY Sf Simple flow source
%DESCRIPTION  Simple flow source constructed from SS with fixed ca

% %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% %% Version control history
% %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% %% $Id: Sf_lbl.txt,v 1.3 1999/08/05 07:32:07 peterg Exp $
% %% $Log: Sf_lbl.txt,v $
% %% Revision 1.3  1999/08/05 07:32:07  peterg
% %% Added in alias
% %%
% %% Revision 1.2  1999/03/12 04:03:09  peterg
% %% Single argument - the value of the flow
% %%
```

```
% %% Revision 1.1  1999/03/03 21:50:15  peterg
% %% Initial revision
% %%
% %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%


% Port aliases
%ALIAS out|in out

% Argument aliases
%ALIAS    $1 f_s
%% Each line should be of one of the following forms:
%       a comment (ie starting with %)
%       component-name cr_name arg1,arg2,..argn
%       blank

% ---- Component labels ----

% Component type SS
[out] SS external,external
u SS internal,f_s
```

Subsystems

No subsystems.

1.2 idNonlinearTanks_cbg.ps

MTT command:

```
mtt idNonlinearTanks cbg ps
```

This representation is given as Figure 1.4 (on page 16).

1.3 idNonlinearTanks_struc.tex

MTT command:

```
mtt idNonlinearTanks struc tex
```

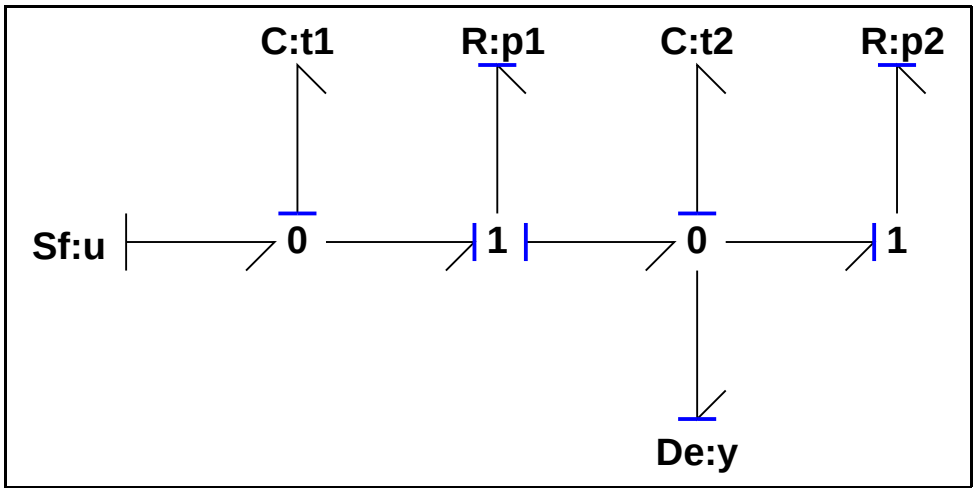

Figure 1.4: System **idNonlinearTanks**, representation cbg (-noargs)

List of inputs for system idNonlinearTanks			
	Component	System	Repetition
1	u	idNonlinearTanks_u_u	1

List of outputs for system idNonlinearTanks			
	Component	System	Repetition
1	y	idNonlinearTanks_y_y	1

List of states for system idNonlinearTanks			
	Component	System	Repetition
1	t1	idNonlinearTanks_t1	1
2	t2	idNonlinearTanks_t2	1

1.4 idNonlinearTanks_sympar.tex

MTT command:

```
mtt idNonlinearTanks sympar tex
```

Parameter	System
V_1	idNonlinearTanks
V_2	idNonlinearTanks
alpha	idNonlinearTanks
beta	idNonlinearTanks
g	idNonlinearTanks
rho	idNonlinearTanks

Table 1.1: Parameters

1.5 idNonlinearTanks_ode.tex

MTT command:

```
mtt idNonlinearTanks ode tex
```

$$\dot{x}_1 = -\left(\frac{\left((x_1+v_1)^{\left(\frac{1}{3}\right)}2^{\left(\frac{2}{3}\right)}3^{\left(\frac{1}{3}\right)}g\rho-(x_2+v_2)^{\left(\frac{1}{3}\right)}2^{\left(\frac{2}{3}\right)}3^{\left(\frac{1}{3}\right)}g\rho\right)}{\left(\pi^{\left(\frac{1}{3}\right)}\beta\right)}\right)^{\left(\frac{1}{\alpha}\right)}+u_1$$

$$\dot{x}_2 = \left(\frac{\left((x_1+v_1)^{\left(\frac{1}{3}\right)}2^{\left(\frac{2}{3}\right)}3^{\left(\frac{1}{3}\right)}g\rho-(x_2+v_2)^{\left(\frac{1}{3}\right)}2^{\left(\frac{2}{3}\right)}3^{\left(\frac{1}{3}\right)}g\rho\right)}{\left(\pi^{\left(\frac{1}{3}\right)}\beta\right)}\right)^{\left(\frac{1}{\alpha}\right)}-\left(\frac{\left((x_2+v_2)^{\left(\frac{1}{3}\right)}2^{\left(\frac{2}{3}\right)}3^{\left(\frac{1}{3}\right)}g\rho\right)}{\left(\pi^{\left(\frac{1}{3}\right)}\beta\right)}\right)^{\left(\frac{1}{\alpha}\right)} \tag{1.1}$$

$$y_1 = \frac{\left((x_2+v_2)^{\left(\frac{1}{3}\right)}2^{\left(\frac{2}{3}\right)}3^{\left(\frac{1}{3}\right)}g\rho\right)}{\pi^{\left(\frac{1}{3}\right)}} \tag{1.2}$$

1.6 idNonlinearTanks_ident.ps *(-ieuler)*

MTT command:

```
mtt -i euler idNonlinearTanks ident ps
```

This representation is given as Figure 1.5 (on page 18).

1.7 idNonlinearTanks_rep.txt

MTT command:

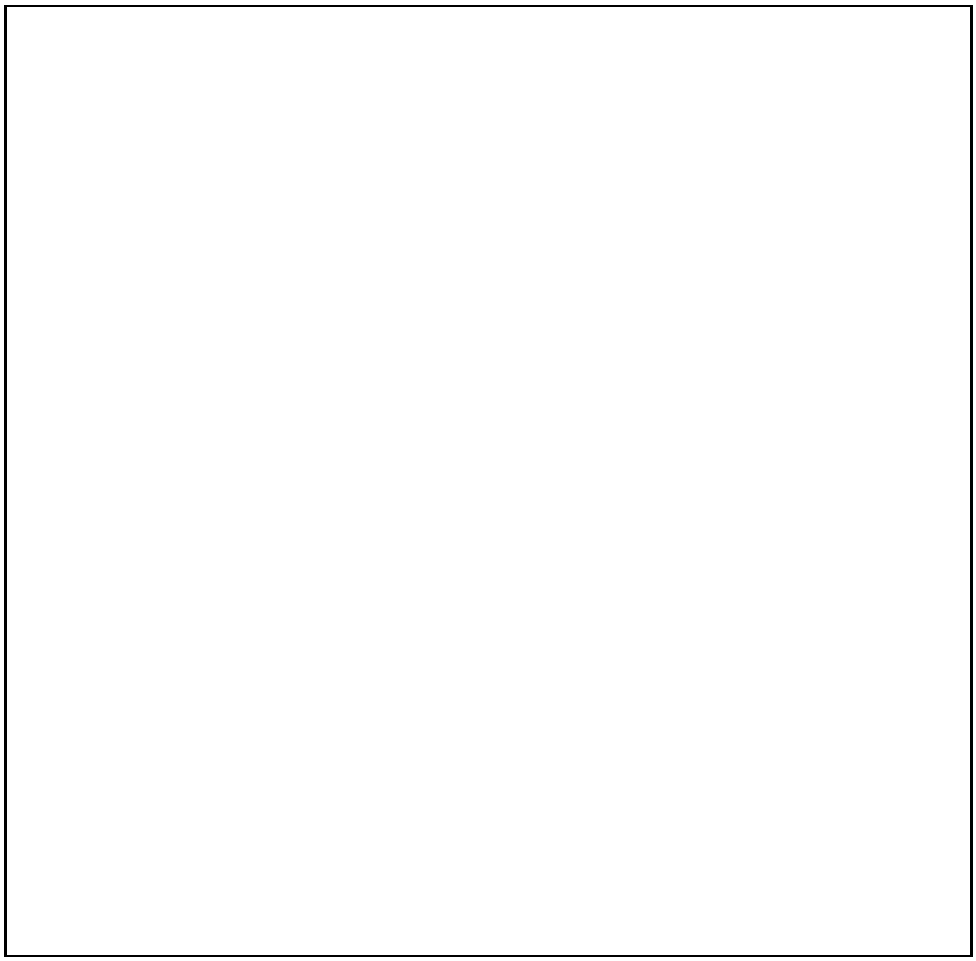

Figure 1.5: System **idNonlinearTanks**, representation ident (-ieuler)

```
mtt idNonlinearTanks rep txt

## -*-octave-*- Put Emacs into octave-mode
## Outline report file for system idNonlinearTanks (idRC_rep.txt)
## Generated by MTT on" Thu Apr  5 11:17:27 BST 2001.

##################################################################
## Version control history
##################################################################
## $Id: idNonlinearTanks_rep.txt,v 1.2 2003/08/18 16:40:25 gawthrop Exp
## $Log: idNonlinearTanks_rep.txt,v $
## Revision 1.2  2003/08/18 16:40:25  gawthrop
## Modified for ident DIY rep (was ippp).
##
## Revision 1.1  2001/04/05 12:00:18  gawthrop
## Identification example
##
## Revision 1.1  2000/12/28 11:58:07  peterg
## Put under RCS
##
##################################################################

mtt idNonlinearTanks abg tex # The system description
mtt idNonlinearTanks cbg ps          # The causal bond graph
mtt idNonlinearTanks struc tex         # The system structure
mtt idNonlinearTanks sympar tex         # The system parameters
## Uncomment the following lines or add others
##mtt idNonlinearTanks dae tex         # The system dae
 mtt idNonlinearTanks ode tex         # The system ode
## mtt idNonlinearTanks sspar tex # Steady-state parameters
## mtt idNonlinearTanks ss tex  # Steady state
## mtt idNonlinearTanks dm tex # Descriptor matrices (of linearised syst
## mtt idNonlinearTanks sm tex # State matrices (of linearised system)
## mtt idNonlinearTanks tf tex # Transfer function (of linearised system
## mtt idNonlinearTanks lmfr ps # log modulus of frequency response (of
## mtt idNonlinearTanks simpar tex # Simulation parameters
## mtt idNonlinearTanks numpar tex # Numerical simulation parameters
## mtt idNonlinearTanks state tex # Simulation initial state
## mtt idNonlinearTanks input tex # Simulation input
## mtt idNonlinearTanks logic tex # Logic control
## mtt -oct -s sidNonlinearTanks odeso ps # Simulation output
```

```
 mtt -i euler idNonlinearTanks ident ps

mtt idNonlinearTanks rep txt # This file
```

Chapter 2

idRC

2.1 idRC_abg.tex

MTT command:

```
mtt idRC abg tex
```

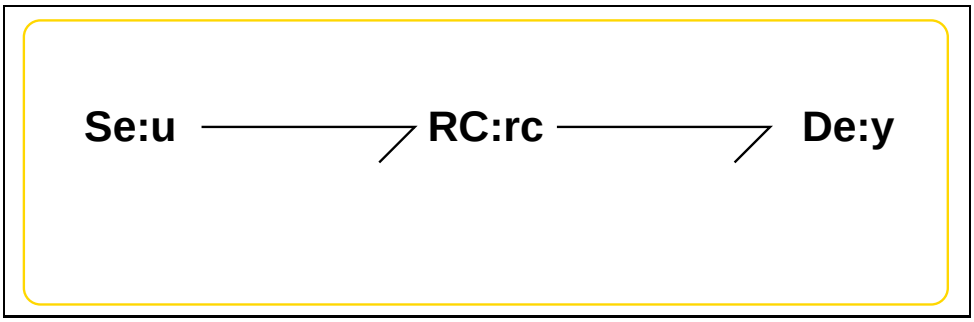

Figure 2.1: System **idRC**: acausal bond graph

The acausal bond graph of system **idRC** is displayed in Figure 2.1 (on page 21) and its label file is listed in Section 2.1.1 (on page 22). The subsystems are listed in Section 2.1.2 (on page 23).
This example illustrates the sensitivity approach to model-based system identification[1].
The system is a simple RC circuit with zero initial condition; the method identifies the resitance *r*.
The data is created by typing:

[1]Peter J Gawthrop, *Sensitivity Bond Graphs*, Journal Franklin Institute, **337**, 2000, pp 907–922

```
make
```

To see the results, type:

```
mtt -oct -i euler  idRC ident view
```

NB All sensitivity coefficients in idRC$_s$*impar.txtmustbesettozero*.

2.1.1 Summary information

System idRC: Detailed description here

Interface information:

Parameter $1 represents actual parameter **c**

Parameter $2 represents actual parameter **r**

Variable declarations:

This component has no PAR declarations

Units declarations:

This component has no UNITs declarations

The label file: idRC_lbl.txt

```
#SUMMARY idRC
#DESCRIPTION Detailed description here

## System idRC, representation lbl, language txt
## File idRC_lbl.txt
## Generated by MTT on Tue Aug 19 14:58:27 BST 2003

  ########################################
  ##### Model Transformation Tools #####
  ########################################

  ############################################################
  ## Version control history
  ############################################################
```

```
  ## $Id: mtt_banner.sh,v 1.2 2001/07/03 22:59:10 gawthrop Exp $
  ## $Log: mtt_banner.sh,v $
  ## Revision 1.2  2001/07/03 22:59:10  gawthrop
  ## Fixed problems with argument passing for CRs
  ##
  ################################################################

## Port aliases

## Argument aliases
#ALIAS $1 c
#ALIAS $2 r

## Each line should be of one of the following forms:
##      a comment (ie starting with #)
##      component-name cr_name arg1,arg2,..argn
##      blank

## ---- Component labels ----

## Component type De
y SS external

## Component type RC
rc lin c;r

## Component type Se
u SS external
```

2.1.2 Subsystems

- De Simple effort detector (1) No subsystems.
- RC A Simple two-port RC circuit (1) No subsystems.
- Se Simple effort source (1) No subsystems.

2.1.3 De

The acausal bond graph of system **De** is displayed in Figure 2.2 (on page 24) and its label file is listed in Section 2.1.3 (on page 24). The subsystems are listed in

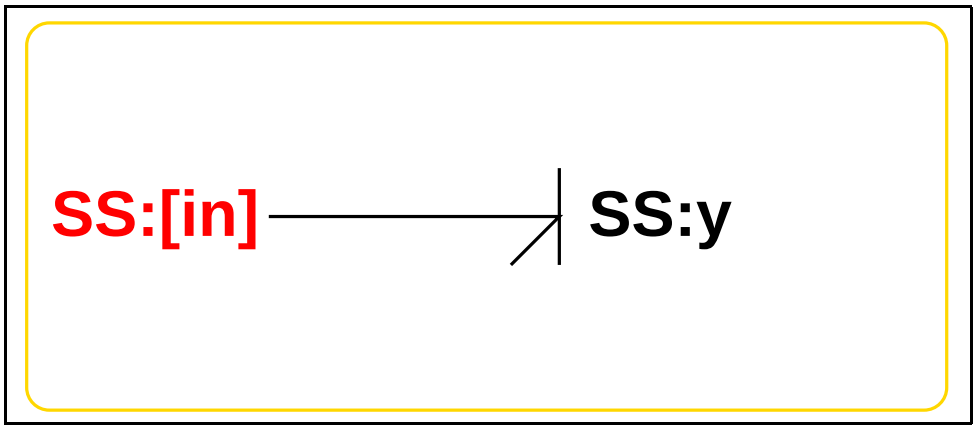

Figure 2.2: System **De**: acausal bond graph

Section 2.1.3 (on page 26).

Summary information

System De:Simple effort detector Simple effort detector constructed from SS with fixed causality

Interface information:

Parameter $1 represents actual parameter **external**

Port in represents actual port **in**

Port out represents actual port **in**

Variable declarations:

This component has no PAR declarations

Units declarations:

This component has no UNITs declarations

The label file: De_lbl.txt

```
%% Label file for system De (De_lbl.txt)
%SUMMARY De Simple effort detector
%DESCRIPTION Simple effort detector constructed from SS with fixed causa

% %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% %% Version control history
% %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% %% $Id: De_lbl.txt,v 1.4 2002/11/07 04:28:23 gawthrop Exp $
% %% $Log: De_lbl.txt,v $
% %% Revision 1.4  2002/11/07 04:28:23  gawthrop
% %% Now has argument - either internal or external
% %%
% %% Revision 1.3  1999/09/07 03:32:21  peterg
% %% Fixed alias bug
% %%
% %% Revision 1.2  1999/09/07 03:21:02  peterg
% %% Aliased to out as well as in
% %%
% %% Revision 1.1  1999/03/03 22:02:04  peterg
% %% Initial revision
% %%
% %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%


% Port aliases
%ALIAS in|out in

% Argument aliases
%ALIAS $1 external

%% Each line should be of one of the following forms:
%      a comment (ie starting with %)
%      component-name cr_name arg1,arg2,..argn
%      blank

% ---- Component labels ----

% Component type SS
[in] SS external,external
```

```
y SS external,0
```

Subsystems

No subsystems.

2.1.4 RC

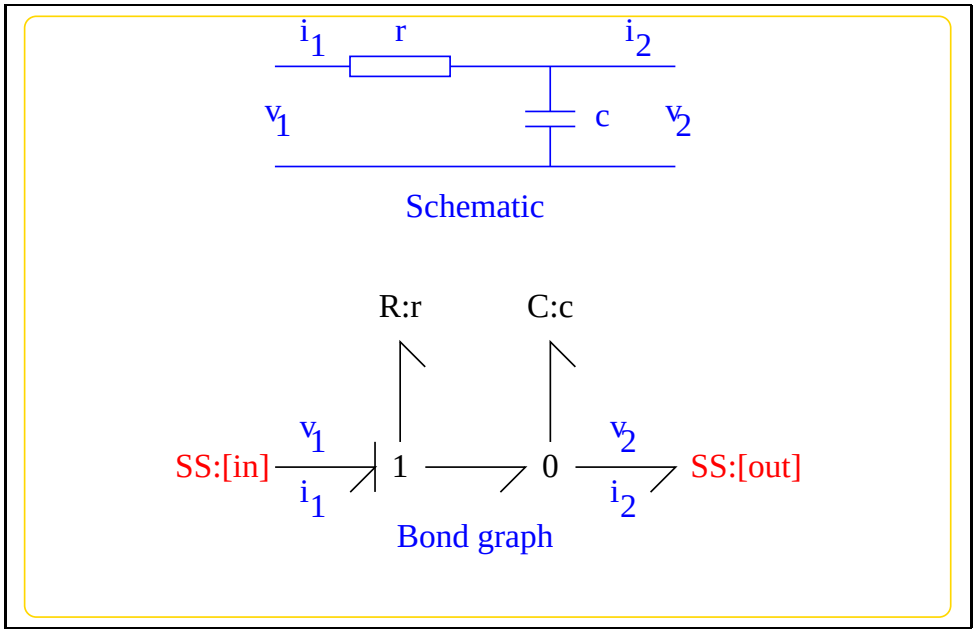

Figure 2.3: System **RC**: acausal bond graph

RC is a Simple two-port RC circuit. The two ports are [in] and [out] and the two parameters are c and r respectively
The acausal bond graph of system **RC** is displayed in Figure 2.3 (on page 26) and its label file is listed in Section 2.1.4 (on page 26). The subsystems are listed in Section 2.1.4 (on page 28).

Summary information

System RC:A Simple two-port RC circuit This simple example is used in the manual.

Interface information:

Parameter $1 represents actual parameter **c** – Capacitance

Parameter $2 represents actual parameter **r** – Resistance

Port in represents actual port **in** – The left-hand port

Port out represents actual port **out** – The right-hand port

Variable declarations:

This component has no PAR declarations

Units declarations:

This component has no UNITs declarations

The label file: RC_lbl.txt

```
%% Label file for system RC (RC_lbl.txt)
%SUMMARY RC A Simple two-port RC circuit
%DESCRIPTION This simple example is used in the manual.

% %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% %% Version control history
% %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% %% $Id: RC_lbl.txt,v 1.4 2001/07/24 04:25:16 gawthrop Exp $
% %% $Log: RC_lbl.txt,v $
% %% Revision 1.4  2001/07/24 04:25:16  gawthrop
% %% Relabeled ports - easier for sensitivity to handle
% %%
% %% Revision 1.3  2000/09/14 15:13:02  peterg
% %% Changed port CRs to give SISO system when used in isolation
% %%
% %% Revision 1.2  1998/07/27 11:09:36  peterg
% %% Commented the aliases.
% %%
% %% Revision 1.1  1998/07/16 20:16:30  peterg
% %% Initial revision
% %%
% %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
```

```
% Port aliases
%ALIAS in in # The left-hand port
%ALIAS out out # The right-hand port

% Argument aliases
%ALIAS $1 c # Capacitance
%ALIAS $2 r # Resistance

%% Each line should be of one of the following forms:
%      a comment (ie starting with %)
%      component-name cr_name arg1,arg2,..argn
%      blank

% ---- Component labels ----

% Component type C
c lin effort,c

% Component type R
r lin flow,r

% Component type SS
[in] SS external,internal
[out] SS external,0
```

Subsystems

No subsystems.

2.1.5 Se

The acausal bond graph of system **Se** is displayed in Figure 2.4 (on page 29) and its label file is listed in Section 2.1.5 (on page 28). The subsystems are listed in Section 2.1.5 (on page 30).

Summary information

System Se:Simple effort source Simple effort source constructed from SS with fixed causality

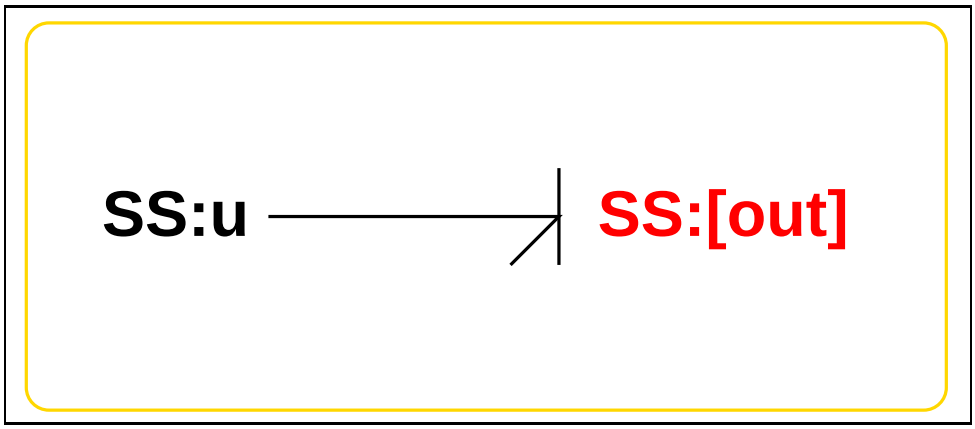

Figure 2.4: System **Se**: acausal bond graph

Interface information:

Parameter $1 represents actual parameter **e_s**

Port in represents actual port **out**

Port out represents actual port **out**

Variable declarations:

This component has no PAR declarations

Units declarations:

This component has no UNITs declarations

The label file: Se_lbl.txt

```
%% Label file for system Se (Se_lbl.txt)
%SUMMARY Se Simple effort source
%DESCRIPTION Simple effort source constructed from SS with fixed causali


% %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% %% Version control history
% %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% %% $Id: Se_lbl.txt,v 1.3 1999/08/05 07:31:39 peterg Exp $
% %% $Log: Se_lbl.txt,v $
```

```
% %% Revision 1.3  1999/08/05 07:31:39  peterg
% %% Added in alias
% %%
% %% Revision 1.2  1999/03/12 04:04:27  peterg
% %% Single argument - the effort value e_s
% %%
% %% Revision 1.1  1999/03/03 21:55:46  peterg
% %% Initial revision
% %%
% %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%


% Port aliases
%ALIAS out|in out

% Argument aliases
%ALIAS $1 e_s

%% Each line should be of one of the following forms:
%       a comment (ie starting with %)
%       component-name cr_name arg1,arg2,..argn
%       blank

% ---- Component labels ----

% Component type SS
[out] SS external,external
u SS e_s,internal
```

Subsystems

No subsystems.

2.2 idRC_struc.tex

MTT command:

```
mtt idRC struc tex
```

List of inputs for system idRC			
	Component	System	Repetition
1	u	idRC__u__u	1

List of outputs for system idRC			
	Component	System	Repetition
1	y	idRC__y__y	1

List of states for system idRC			
	Component	System	Repetition
1	c	idRC__rc__c	1

2.3 idRC_sympar.tex

MTT command:

```
mtt idRC sympar tex
```

Parameter	System
c	idRC
r	idRC

Table 2.1: Parameters

2.4 idRC_ident.ps

MTT command:

```
mtt idRC ident ps
```

This representation is given as Figure 2.5 (on page 32).

2.5 idRC_ident$_{p}$*ar.tex*

MTT command:

```
mtt idRC ident_par tex
```

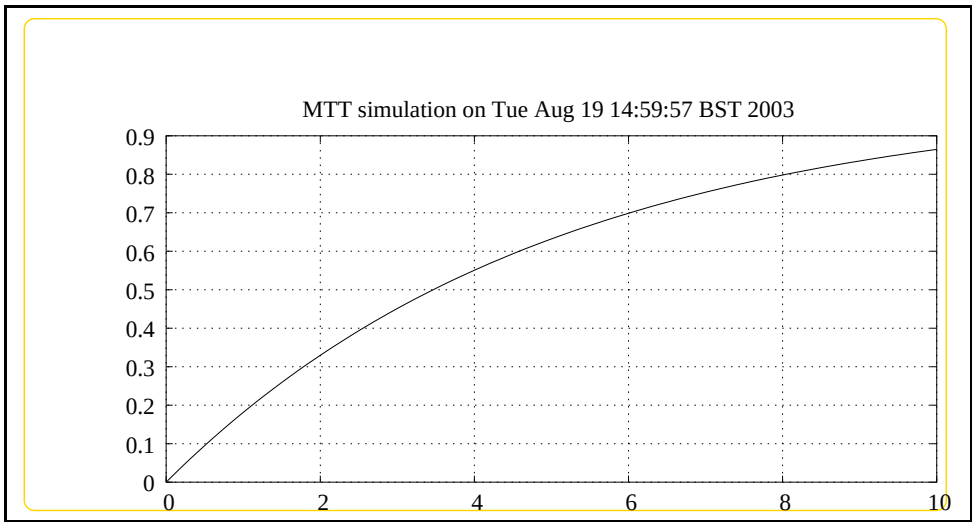

Figure 2.5: System **idRC**, representation ident (-noargs)

Name	Value
r	4.95

Table 2.2: Estimated Parameters

2.6 idRC_rep.txt

MTT command:

```
mtt idRC rep txt
```

```
## -*-octave-*- Put Emacs into octave-mode
## Outline report file for system idRC (idRC_rep.txt)
## Generated by MTT on" Thu Jun 27 17:03:00 BST 2002.

##################################################################
## Version control history
##################################################################
## $Id: idRC_rep.txt,v 1.3 2003/08/18 08:06:17 gawthrop Exp $
## $Log: idRC_rep.txt,v $
## Revision 1.3  2003/08/18 08:06:17  gawthrop
## A working version with more explantion
##
## Revision 1.2  2002/09/23 11:42:14  gawthrop
## Example uses simulated data from idRC_ident_data
```

```
##
## Revision 1.1  2000/12/28 11:58:07  peterg
## Put under RCS
##
#############################################################

mtt idRC abg tex # The system description
##mtt idRC cbg ps          # The causal bond graph
mtt idRC struc tex         # The system structure
mtt idRC sympar tex         # The system parameters

## Uncomment the following lines or add others
## mtt idRC dae tex         # The system dae
## mtt idRC ode tex         # The system ode
## mtt idRC sspar tex # Steady-state parameters
## mtt idRC ss tex  # Steady state
## mtt idRC dm tex # Descriptor matrices (of linearised system)
## mtt idRC sm tex # State matrices (of linearised system)
## mtt idRC tf tex # Transfer function (of linearised system)
## mtt idRC lmfr ps # log modulus of frequency response (of linearised s
## mtt idRC simpar txt # Simulation parameters
## mtt idRC numpar txt # Numerical simulation parameters
## mtt idRC state txt # Simulation initial state
## mtt idRC input txt # Simulation input
## mtt idRC logic txt # Logic control
## mtt idRC odeso ps # Simulation output


## Linear identificationm
##mtt idRC ident_numpar tex
mtt idRC ident ps
##mtt idRC ident_comparison ps
mtt idRC ident_par tex

mtt idRC rep txt # This file
```

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