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## **Linear Models | SpringerLink**

The parameters of a linear compartment model are usually estimated from experimental input-output data. A problem arises when infinitely many parameter values can yield the same

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result; such a model is called unidentifiable.

## Identifiability Of Linear Compartment Models

2 N. Meshkat, S. Sullivant,  
and M. Eisenberg,



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Identifiability results for  
several classes of linear  
compartment models, In  
preparation. Example:  
Manganese Model 3 3 P. K.  
Douglas, M. S. Cohen, and J.  
J. DiStefano III, Chronic  
exposure to Mn inhalation

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may have lasting effects: A  
physiologically -based  
toxico

## **Identifiability of Linear Compartmental Models: The Effect ...**

Identifiability concerns

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finding which unknown parameters of a model can be estimated, uniquely or otherwise, from given input-output data. If some subset of the parameters of a model cannot be determined given input-output data,

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then we say the model is unidentifiable. In this work, we study linear compartment models, which are a class of biological models commonly used in ...

**Identifiable**

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**reparametrizations of linear  
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Effect of Moving Inputs,  
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mathematical model is

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identifiable if its  
parameters can be recovered  
from data.

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2 N. Meshkat, S. Sullivant,  
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Identifiability results for  
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exposure to Mn inhalation  
may have lasting effects: A  
physiologically-based toxico-  
kinetic model in rats,  
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Chemistry 92 (2) (2010)  
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## **Structural Identifiability for Compartmental Models**

IDENTIFIABILITY OF LARGE

COMPARTMENTAL MODELS R. F.

Brown and J. P Norton\*

School of Electrical

Engineering, University of

New South Wales, Kensington...

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## **Identifiability Results for Several Classes of Linear**

...

Identifiability of affine  
linear parameter-varying

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models Structural  
identifiability and  
indistinguishability of  
certain two-compartment  
models incorporating  
nonlinear efflux from the  
peripheral compartment

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**Identifiable**

**reparametrizations of linear  
compartment models**

In this work, we study  
linear compartment models,  
which are a class of  
biological models commonly  
used in pharmacokinetics,

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physiology, and ecology. In  
past work, we used  
commutative algebra and  
graph theory to identify a  
class of linear compartment  
models that we call  
identifiable cycle models,  
which are unidentifiable but

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have the simplest possible  
identifiable functions (so-  
called monomial ...

**Identifiability and  
indistinguishability of  
linear ...**

This chapter describes a

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method [W1, W6 – W9] for testing linear time-invariant models for s.g. identifiability, as a result of a study on compartmental models. When dealing with such models, one can...

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## **Identifiability of Large Compartmental Models - PDF Free ...**

This work addresses the problem of identifiability, that is, the question of whether parameters can be recovered from data, for



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linear compartment models.  
Using standard differential  
algebra techniques, the  
question of whether a given  
model is generically locally  
identifiable is equivalent  
to asking whether the  
Jacobian matrix of a certain

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coefficient map, arising  
from input-output equations

...

**LINEAR COMPARTMENTAL MODELS:  
INPUT-OUTPUT EQUATIONS AND**

...

Input-output equations I

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Setup: a linear compartment model  $I$  Let  $m =$  number of compartments  $I$  An input-output equation is an equation that holds along any solution of the ODEs, involving only input variables  $u_i$  and output

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variables  $y_i$  (and  
parameters  $k_{ij}$ ), and their  
derivatives I Example,  
continued:  $\dot{y}_1 = k_{21}y_2 - (k_{01} + k_{12} + k_{21})y_1 + k_{01}y_0$   
 $\dot{y}_2 = k_{02}y_0 - (k_{02} + k_{12} + k_{21})y_2 + k_{01}y_1$

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**Identifiability results for  
several classes of linear**

...

Identifiability concerns finding which unknown parameters of a model can be quantified from given input-output data. Many linear ODE

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models, used in systems  
biology and  
pharmacokinetics, are ...

### **IDENTIFIABILITY OF LINEAR COMPARTMENT MODELS: THE SINGULAR ...**

If  $h_2 = 0$ , but compartment 2

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can also be perturbed, the model is: (i) non-identifiable if  $U_1(t)$  and  $U_2(t)$  are both impulses; (ii) globally identifiable (provided The identifiability of linear compartmental models  $h_i$  is

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known) if  $U_1(t)$  is an infusion and  $u_z(t)$  an impulse;  $(H_i)$  globally identifiable (even if  $h_i$  is unknown) if  $U_1(t)$  is an impulse and  $u_z(t)$  an infusion.



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### **Identifiability of linear compartmental models**

IDENTIFIABILITY OF LINEAR

COMPARTMENT MODELS: THE

SINGULAR LOCUS ELIZABETH

GROSS, NICOLETTE MESHKAT,

AND ANNE SHIU Abstract. This

work addresses the problem

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of identifiability, that is, the question of whether parameters can be recovered from data, for linear compartment models.

**Identifiability of linear compartmental models**

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Abstract: This work addresses the problem of identifiability, that is, the question of whether parameters can be recovered from data, for linear compartment models. Using standard differential

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algebra techniques, the question of whether a given model is generically locally identifiable is equivalent to asking whether the Jacobian matrix of a certain coefficient map, arising from input-output ...

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## **The Identifiability of Linear Compartmental Models**

...

The Identifiability of  
Linear Compartmental Models  
... This work focuses on the  
identi ability problem for

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linear compartment models. Linear compartment models are used extensively in biological applications, such as pharmacokinetics, toxicology, cell biology, physiology, and ecology [2, 3, 7, 9, 12].

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**Identifiability Results for  
Several Classes of Linear**

...

LINEAR COMPARTMENTAL MODELS:  
INPUT-OUTPUT EQUATIONS AND  
OPERATIONS THAT PRESERVE  
IDENTIFIABILITY ELIZABETH

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GROSS, HEATHER HARRINGTON,  
NICOLETTE MESHKAT, AND ANNE  
SHIU Abstract. This work  
focuses on the question of  
how identifiability of a  
mathematical model, that is,  
whether parameters can be  
recovered from data, is



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related to identifiability-

## **[1709.10013] Identifiability of linear compartment models**

...

Structural identifiability  
concerns finding which  
unknown parameters of a

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model can be quantified from given input-output data.

Many linear ODE models, used in systems biology and pharmacokinetics, are unidentifiable, which means that parameters can take on an infinite number of values

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and yet yield the same  
input-output data.

**On the existence of  
identifiable  
reparametrizations for ...**  
Structural Identifiability  
for Compartmental Models

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David Griffiths CSIRO

Division of Mathematics and  
Statistics P.O. Box 218,  
Lindfield, N.S.W. 2070

Australia The problem of  
structural identifiability  
in compartmental models is  
examined and illustrated

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with a three-compartment model used by Jennrich and Bright [4] and Wiggins [13] to

**Identifiability of linear compartment models: the singular ...**

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Identifiability concerns finding which unknown parameters of a model can be estimated from given input-output data. If some subset of the parameters of a model cannot be determined given input-output data, then we

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say the model is unidentifiable. In past work we identified a class of models, that we call identifiable cycle models, which are not identifiable but have the simplest possible ...

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06a9](#)