

# Peter Stepien Web Site

Welcome to my web site.<sup>1</sup>

I am a Senior Research and Development Engineer at ResTech, based at the University of Newcastle, Australia. More recently I have also been an academic at the University of Sydney and a casual academic at the University on Newcastle. This web site contains some information relevant to my teaching and research, although it is not complete. This web site was previously hosted at the School of Electrical Engineering and Computer Science at the University of Newcastle and previous to that at the School of Electrical and Information Engineering at the University of Sydney, Australia. It is now on my own web site that will be available regardless of who my main employer may be.

Check the announcements for recent additions.

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## Announcements

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12/7/2009 The web site has been moved from the University of Newcastle to a new location.

[Announcement history](#)

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<sup>1</sup>This document is the PDF version of the web site located at <http://www.PeterStepien.com>.

## 1 About this Site

Information contained in this web site can be accessed directly through the links at the bottom of the home page. Alternatively, a navigation aid is provided at the bottom of each page.

As not to waste paper resources when printing from this site, documents have been provided in one or more of the following formats (shown with the corresponding tag):

- PDF file with one page at a time (pdf).
- PDF file with two pages at a time (pdf-2up).
- PDF file with four pages at a time (pdf-4up).
- HTML for direct on-line viewing (html).

To make it easier to get a hard copy of the information contained at the top level of this web site, it is also available as a PDF file:

- Web Site Document for Peter Stepien ([pdf](#), [pdf-2up](#))

Comments and suggestions regarding the web site are welcome.

## 2 Teaching

The following is a list of my teaching responsibilities for previous years as a casual lecturer in the School of Electrical Engineering and Computer Science at the University of Newcastle:

- Year 2007:
  - ELEC4700 *Advanced Computer Systems*

The following is a list of my teaching responsibilities while working in the School of Electrical and Information Engineering at the University of Sydney:

- Year 2006:
  - ELEC2302 *Signals and Systems*
  - ELEC4605 *Computer Engineering*
  - ELEC4707 *Engineering Project*
  - ENGG1061 *Advanced Engineering Project*
- Year 2005:
  - ELEC4605 *Computer Engineering*
  - ELEC4707 *Engineering Project*
  - ENGG1061 *Advanced Engineering Project*
  - NETS3017/3917 *Network Programming and Distributed Applications*

- Year 2004:
  - ELEC4601/6605 *Computer Design*
- Year 2003:
  - ELEC4601/6605 *Computer Design*

Does not include courses where there was only a minor involvement or any courses before 2003.

## 3 Software

The following software has been written by myself. Please do not distribute modified versions of this software. Instead, notify me of any problems so that they can be included in future releases. You may distribute unmodified versions of this software for research and non-profit use.

All comments and suggestions are most welcome.

### 3.1 Independent Component Analysis

The Independent Component Analysis (ICA) program called *ica* provides source separation for a number of mixed signals where the number of recordings is equal to the number of the sources. A good description of the ICA algorithm used can be found in Anthony J. Bell and Terrence J. Sejnowski, "An information-maximisation approach to blind separation and blind deconvolution", *Neural Computation*, 7(6):1129-1159, 1995. The non-linearity used to perform the separation is based on either the  $\exp()$  or  $\tanh()$  function.

Input to the program can come from one of four different file formats. These include 16 bit integers, 32 bit floating point numbers, 64 bit floating point numbers and the European Data Format (EDF). In the case of the integer and the floating point numbers, these are stored such that all the values from a particular point in time are stored together. The input data does not have to be zero meaned before being used by this program. The original unmixing matrix can also be set otherwise a unity matrix is used.

The output from the program is optionally the unmixed input stored in a file as either 16 bit integers, 32 bit floating point numbers or 64 bit floating point numbers. The resultant unmixing matrix can also be saved to a file.

The progress of the program is displayed for each loop through the data. After the input data has been processed and the unmixed version saved to a file, the RMS value of the covariance matrix for the unmixed and the mixed signals will be calculated. This is just to give a rough indication on how well the data has been separated. Note that the input data does not get sphered. The displaying of the RMS covariance is optional and is reliant on the unmixed output being saved to a file.

The *ica* program was written for Unix based systems. The source is available as a *tar* archive which has been compressed with *gzip* can be downloaded:

- Independent Component Analysis Program Source (V0.05) ([ica-0.05.tgz](#))

Instructions for building and using the program are contained with the program source.

## 3.2 Teaching Resource System

The Teaching Resource System has been developed to provide a convenient way of generating various teaching resources. The methodology behind the system is that a single source file can be used to generate different resources. For example, lecture notes, lecture slides and lecture slide notes all come from a single source file. This system can also be used for other applications and incidentally has been used to generate what you are currently reading.

A paper on the system has been written and presented at ICECE'2007 in Brazil. To show the utility of the system, it was used to generate the slides for the presentation. More information can be found on a separate web site:

- TRS1000 *Teaching Resource System*  
(<http://www.PeterStepien.com/TRS1000>)

More information regarding this system and also the code used to generate it will be made available here in the future. I have actually said this for a while now, but have not got back to it. My apologies to the people who have expressed interest in this system. Note also that the links on the example TRS1000 web site are now out of date.

## 4 Announcement History

Below is a history of announcements made on this web site over the last year or so for reference:

<i>Date</i>	<i>Announcement</i>
12/7/2009	The web site has been moved from the University of Newcastle to a new location.
20/4/2008	Moved the web site from the University of Sydney to the University of Newcastle.
8/3/2007	Information on the Teaching Resource System as presented at ICECE'2007 can be found in the <a href="#">Software</a> section.
1/1/2007	No longer at the University of Sydney, although can still be contacted by email.

## 5 Contact Information

Contact details at my present employer are:



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