

# Frontier of Computer Algebra System Apps Developments

数式処理アプリ開発の最前線

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Mathematical Software and Free Documents XVI

Kyoto University, JPN March 19<sup>th</sup>, 2013

# Mainframe, Personal and Cloud

1942 ABC (Atanasoff Berry Computer)

1946 ENIAC

1949 EDSAC

1951 WITCH

▪ ▪ ▪

1977 Apple II

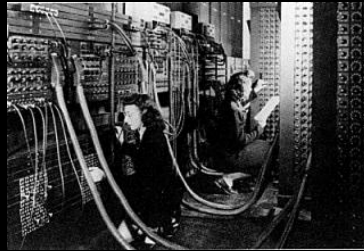
1981 IBM PC, PC-8801

1983 HVC (Home Video Computer)

1984 IBM PC/AT

▪ ▪ ▪

2010 iPad



**“WITCH reboot”**

The Harwell Dekatron gets a reboot  
November 2012, English Museum

21<sup>st</sup> Century – Era of Cloud Computing

- Stream and Exascale Computing : Supercomputing System

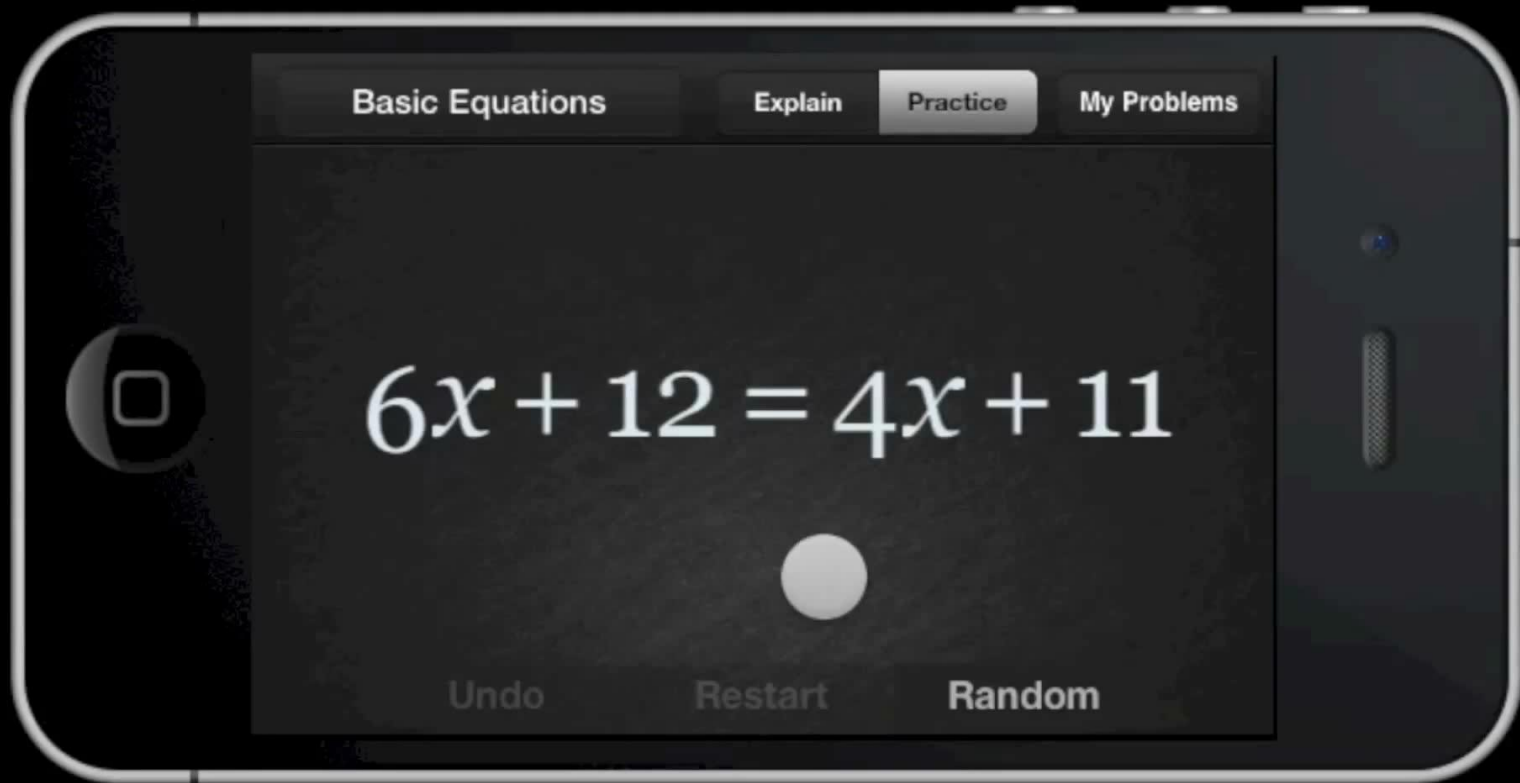
- **Portability : Development of Tablet Devices and Smartphones**



# Today's Topic: CAS-apps Developments

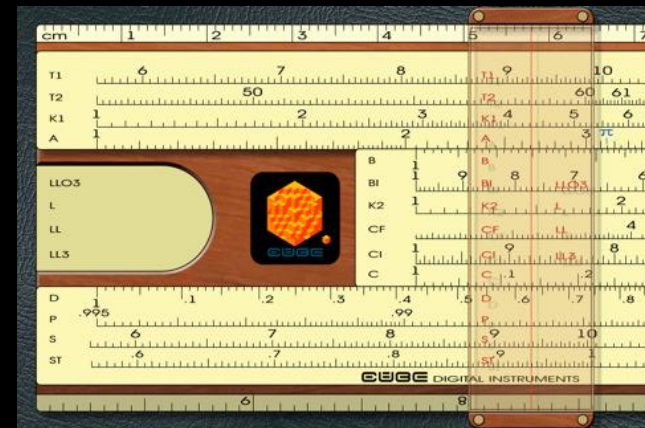
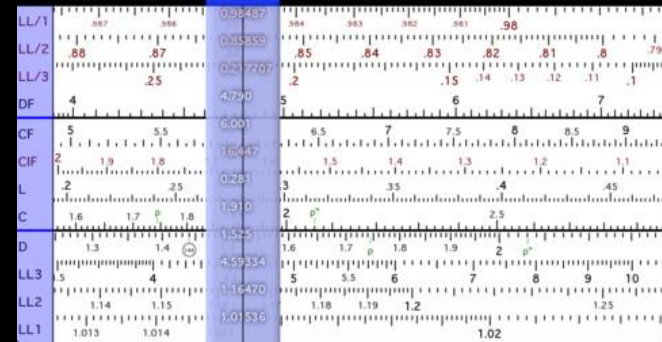
**Algebra Touch** for iPhone / iPad / iPod Touch

by Regular Berry / ¥170



# CAS-apps : Misc.

## Slipstick (Slide Rule) apps



**iSlideRule** / v.1.2 / ¥170

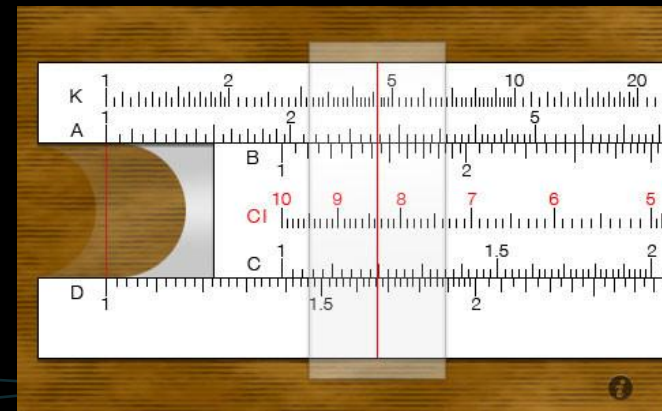
by Reid Performance Designs

**Cube Slide Rule** / v.1.1 / ¥85

by cube-apps / Angel Genov

**Slide Rule** / v.1.1 / ¥85

by Masayuki Akamatsu

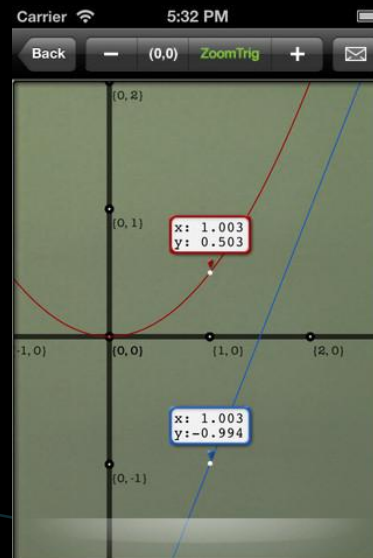
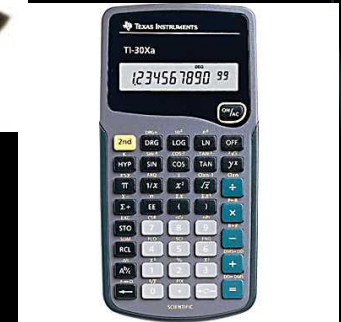
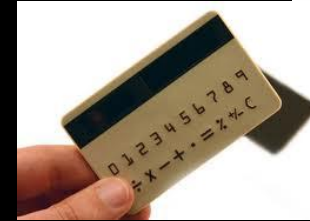
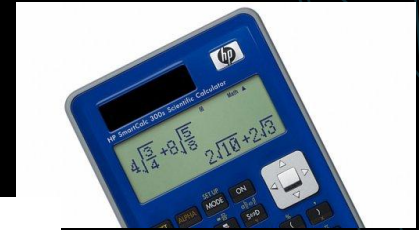


# CAS-apps : Misc.

## Scientific Calculator's emulator

**m48 / hpcalc.org Software Archive m48+**  
by Markus Gonser / v.1.3 / FREE (¥900 for +)

**RK-89: Symbolic Graphing Calculator**  
by Nic Westlake / v.o.9.2 / ¥1,700

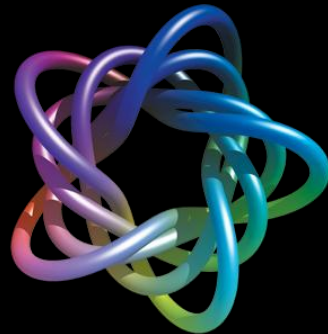
The logo for 'ADICTOS HP' features a stylized calculator icon in a red square followed by the text 'ADICTOS' in a bold, sans-serif font and 'hp' in a smaller, lowercase font with a stylized 'h'.

Comunidad sobre calculadoras HP  
HP8C/G1 HP85/+ HP50C

EMULADOR hp48 PARA  
iphone

The 'm48' logo consists of a stylized orange calculator icon with the text 'm48' in a bold, sans-serif font to its right.

# CAS and CAS-apps



Mathematica

-- **Wolfram Alpha**

Risa/Asir

-- **Asir on Android**

Sage

-- **Sage Math / Python Math**

Pari/GP

-- **PariDroid**

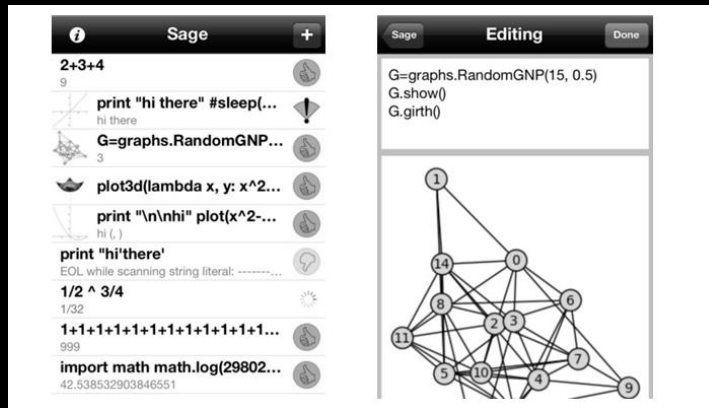
Maxima

-- **Maxima on Android**

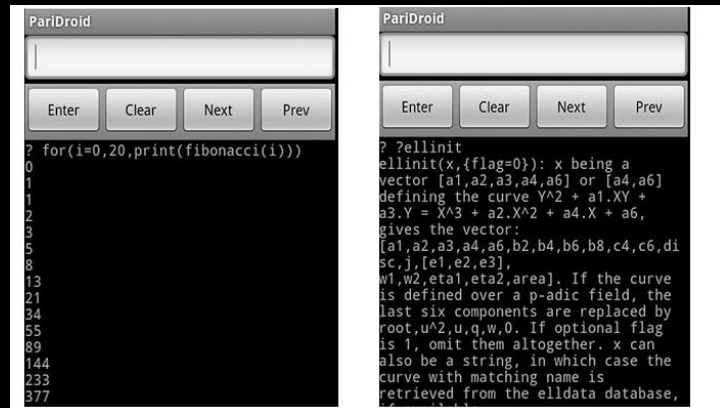
REDUCE

-- **iCAS**

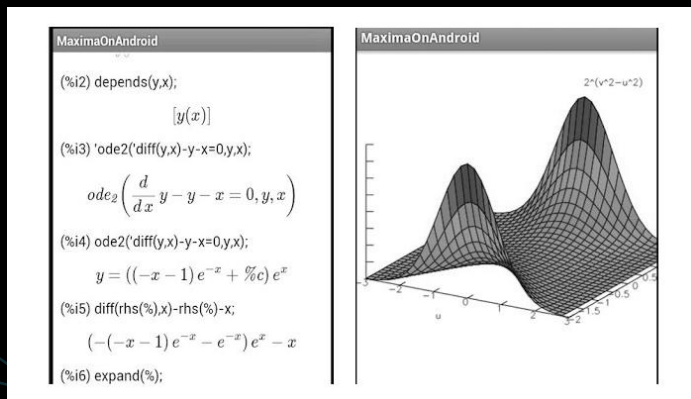
# CAS-apps



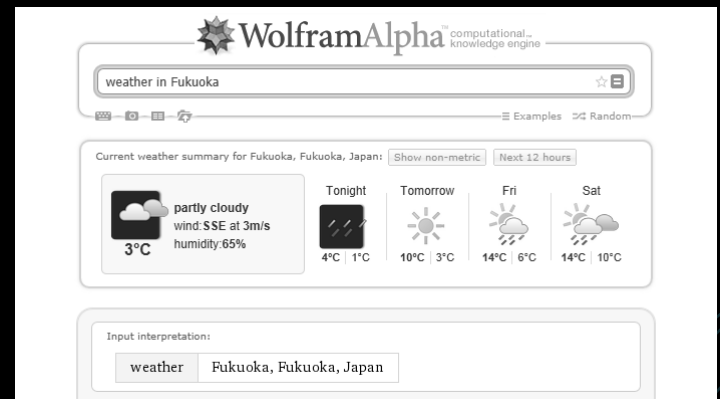
**Sage Math**  
(based on Sage)



**PariDroid**  
(based on Pari/GP)



**Maxima on Android**  
(based on Maxima)



**Wolfram Alpha**  
(based on Mathematica)

# CAS-apps

## Sage Math

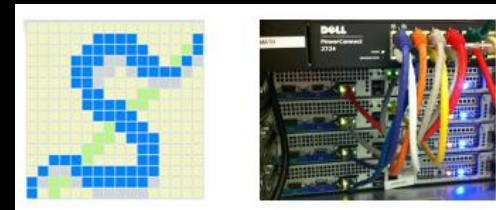
by Ivan Andrus, [sagemath.org](http://sagemath.org) / FREE

Version Updated!! – v.2.1.1 (Jan. 2013)

- Non-commercial
- Based on Sage Notebook
- GAP, GP, Maxima, Octave, R, Singular etc.

Next Generation: Sage-app dev. project "Salvus" is going on

- for huge-clusters, many users
- will be released in this Spring-Summer



Cancel



# CAS-apps

## Wolfram Alpha

by Wolfram Alpha LLC / ¥170

Release Date: May 2009 / v.1.5

- Commercial

- 15,000,000 lines of codes with webMathematica+gridMathematica

- 10,000 CPUs

Professional Version "Wolfram Alpha Pro"

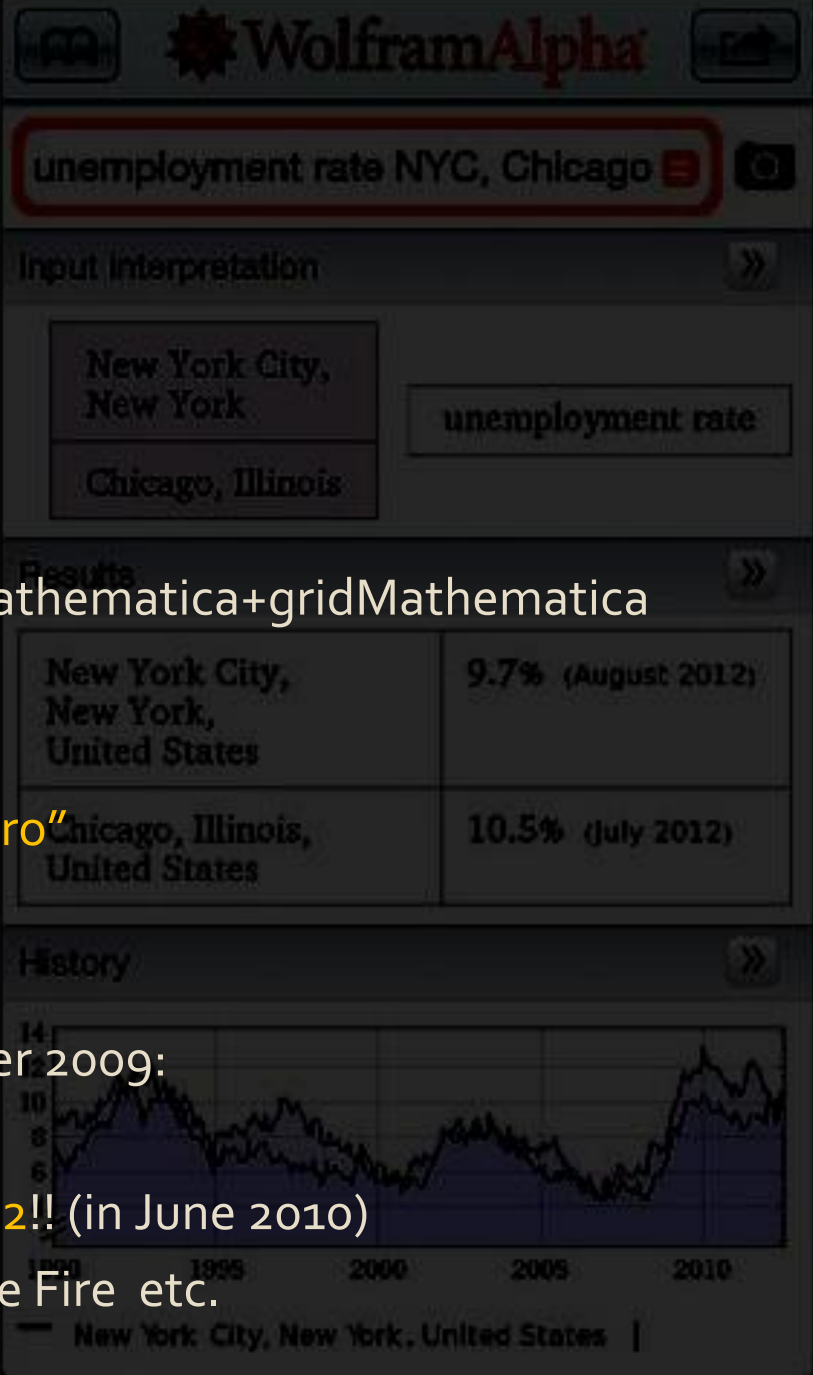
Release Date: February 2012

iPhone app was introduced in December 2009:

- Initial Price : \$50

- Responded by lowering the price to \$2!! (in June 2010)

- Other OS version: Android OS, Kindle Fire etc.



# CAS-apps

off echo;

## MathStudio

by Pomegranate Apps / ¥1,700 / v.5.4

\* Previously called "SpaceTime"

(Scientific Computing in the palm of your hand)

$$\left\{ \sin(x+3) = e^{\sqrt{\{b/a\}}}, \sin(x+3) = \frac{1}{e^{\sqrt{\{b/a\}}}} \right\}$$

- No internet connection required!!

{(x=1, y=2)} High-performance <<< Easy-handling

- No arbitrary-precision arithmetic

$$\text{iCAS} \left\{ \left\{ z = \frac{y}{b}, x = \frac{a \cdot y + b}{b} \right\} \right\}$$

by AL (Antonio Lagana) Software / ¥1,300

\* App version of REDUCE

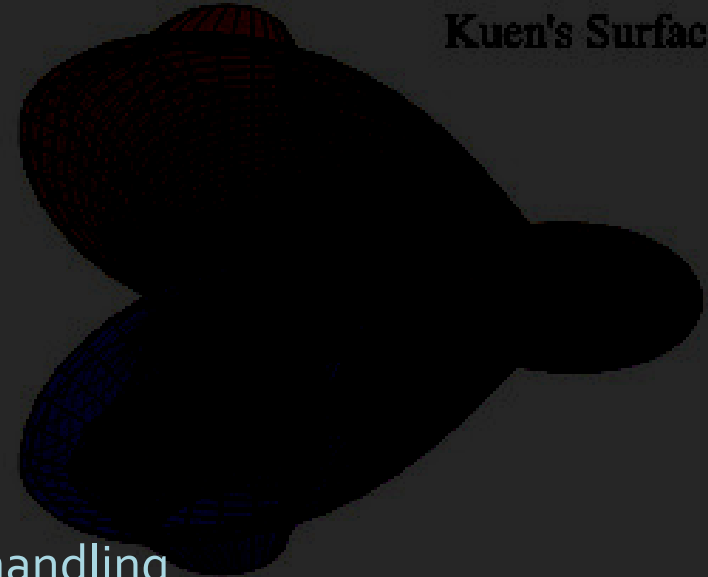
/ Graphical output: GNUPLOT

MathStudio vs. iCAS --- Maxima is better??

GNUPLOT

Kuen's Surface

Kuen's Surface



# CAS-apps

You can run Maxima, a computer algebra system, on your Android mobile devices

## Maxima on Android

by Yasuaki Honda / FREE

Version 1.6

Highly recommended!!

- Graphical output (GNU PLOT)

- FREE of charge

- No internet connection required

Source code is available!! (from December 2012)

- hosted on GitHub

Sage uses Maxima's system as Symbolic Calculation Category

Oct. 5, 2012

A new apk version 1.5 is pushed out to [Google Play](#). This version supports the graph drawing capabilities thanks to Gnuplot 4.6.

Sept. 17, 2012

The source code of the APK is now available under GPL2 in the page "How to build Maxima on Android".

### Contents

- 1 News
- 2 Download "Maxima on Android"
- 3 What is "Maxima on Android"?
- 4 How to use Maxima on Android

### News

Dec. 30, 2012

Source code of Maxima on Android is now available from [here](#) hosted on Github.

Dec. 16, 2012

Maxima on Android version 1.6 is pushed out to Google Play. This version supports menu key. Inside menu you can access English and Japanese manuals as well as graph redrawing. Also, app start up speed is significantly faster.

Oct. 16, 2012

I have added how to save and restore Maxima session in the "How to use Maxima on Android" section.

+1 8

### Site owners

本田康晃

### Related Links

[Maxima home](#)  
[imaxima and imath home page](#)  
[Maximaでつづる数学の旅](#)

### ナビゲーション

How to build  
 Maxima on  
 Android  
 Maxima for  
 beginners

```
terminal++@192.168.11.2:~$ uname -a
Linux localhost 3.1.10-g05b777c #1 SMP PREEMPT Thu Nov 29 10:
35:37 PST 2012 armv7l GNU/Linux
terminal++@192.168.11.2:~$ fep asir
Welcome to fep! Editmode is emacs
I'm a front end processor for asir
History will be saved to .fephistory
This is Risa/Asir, Version 20130215 (Kobe Distribution).
Copyright (C) 1994-2000, all rights reserved, FUJITSU LABORAT
ORIES LIMITED.
Copyright 2000-2007, Risa/Asir committers, http://www.openxm.
org/.
GC 7.2 copyright 1988-2012, H-J. Boehm, A. J. Demers, Xerox,
SGI, HP.
[0] load("cyclic");
[10] C=cyclic(7);
[c6*c5*c4*c3*c2*c1*c0-1,((((c5+c6)*c4+c6*c5)*c3+c6*c5*c4)*c2
+c6*c5*c4*c3)*c1+c6*c5*c4*c3*c2)*c0+c6*c5*c4*c3*c2*c1,((((c4+
c6)*c3+c6*c5)*c2+c6*c5*c4)*c1+c6*c5*c4*c3)*c0+c5*c4*c3*c2*c1+
c6*c5*c4*c3*c2,(((c3+c6)*c2+c6*c5)*c1+c6*c5*c4)*c0+c4*c3*c2*c
1+c5*c4*c3*c2+c6*c5*c4*c3,((c2+c6)*c1+c6*c5)*c0+c3*c2*c1+c4*c
3*c2+c5*c4*c3+c6*c5*c4,(c1+c6)*c0+c2*c1+c3*c2+c4*c3+c5*c4+c6*
c5,c0+c1+c2+c3+c4+c5+c6]
[11] cputime(1)$
0sec(3.886e-05sec)
[12] nd_gr(C,vars(C),31991,0)$
19.21sec + gc : 0.23sec(20.16sec)
[13] █
```

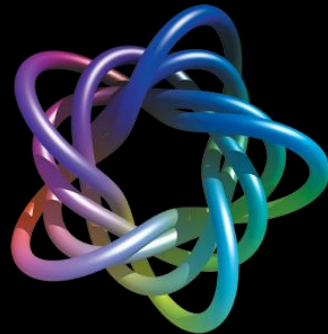


**Asir on Android**

by Mitsushi Fujimoto / FREE



# CAS and CAS-apps



Mathematica

-- Wolfram Alpha

Risa/Asir

-- Asir on Android

Sage

-- Sage Math / Python Math

Pari/GP

-- PariDroid

Maxima

-- Maxima on Android

REDUCE

-- iCAS

# Announcement

## 数式処理研究と産学連携の新たな発展

### Development of Computer Algebra Research and Collaboration with Industry (IMI-DCAR'13)

IMI Joint Int'l Conference



Date (planned) : August 21<sup>st</sup> – 23<sup>rd</sup> , 2013

Venue : Kyushu University, Fukuoka, JPN

Organizing Committee:

- Akira Terui (University of Tsukuba)
- Hirokazu Anai (Fujitsu lab. / IMI)
- Katsuyoshi Ohara (Kanazawa University)
- Hiroshi Yokota (Toshiba Information Systems Co. Ltd.)
- Tatsuyoshi Hamada (Fukuoka University / JST CREST / OCAMI)
- Shun'ichi Yokoyama (IMI / JST CREST)