eosc | FAIRCORE4EOSC
Core Components Supporting a FAIR EOSC

swMATH and Software Heritage

2nd of June 2023

Maxence Azzouz-Thuderoz & Shiraz Malla Mohamad

Funded by the European Union

eosc | FAIRCORE4EOSC
Core Components Supporting a FAIR EOSC

What is swMATH?

The largest catalogue for mathematical software!

- **42 721** referenced **software packages**
- accessible through the **zbMATH Open** portal, the world largest online resource for mathematicians
- We index **software**, **authors** and **research articles**, making our software metadata a connected resource in the academy

zbMATH Open
THE FIRST RESOURCE FOR MATHEMATICS

Funded by
the European Union

eosc | FAIRCORE4EOSC
Core Components Supporting a FAIR EOSC

What is the link rotting challenge we are facing at swMATH?

Netgen

swMATH ID:	6679
Software Authors:	J. Schöberl, J. Gerstmayr, R. Gaisbauer
Description:	NETGEN: An advancing front 2D/3D-mesh generator based on abstract rules. The algorithms of the automatic mesh generator NETGEN are described. The domain is provided by a Constructive Solid Geometry (CSG). The whole task of 3D mesh generation splits into four subproblems of special point calculation, edge following, surface meshing and finally volume mesh generation. Surface and volume mesh generation are based on the advancing front method. Emphasis is given to the abstract structure of the element generation rules. Several techniques of mesh optimization are tested and quality plots are presented.
Homepage:	http://www.hpfem.jku.at/netgen/
Programming Languages:	C++
Keywords:	automatic mesh generator NETGEN
Related Software:	NGSolve; Gmsh; TetGen; Triangle; PETSc; FEniCS; CGALmesh; ParaView; hypre; CGAL; Matlab; OpenFOAM; Trilinos; DistMesh; Python; deal.ii; Neper; CUDA; FEAP; PARDISO
Cited in:	193 Publications

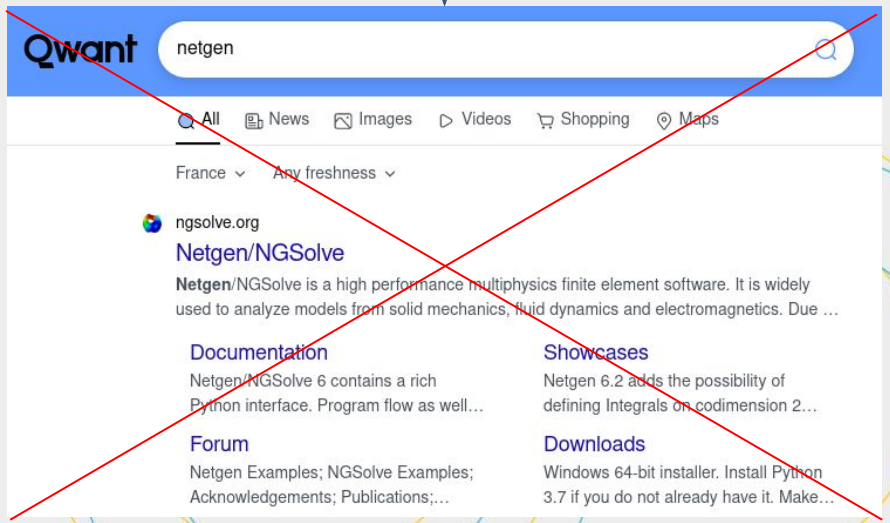
Hmm. We're having trouble finding that site.

We can't connect to the server at www.hpfem.jku.at.

If you entered the right address, you can:

- Try again later
- Check your network connection
- Check that Firefox has permission to access the web (you might be connected but behind a firewall)

Try Again

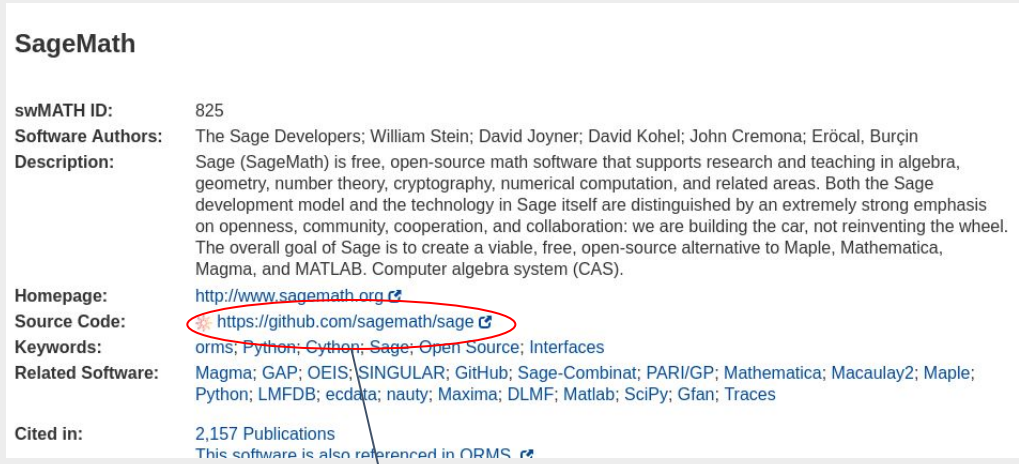


Funded by the European Union

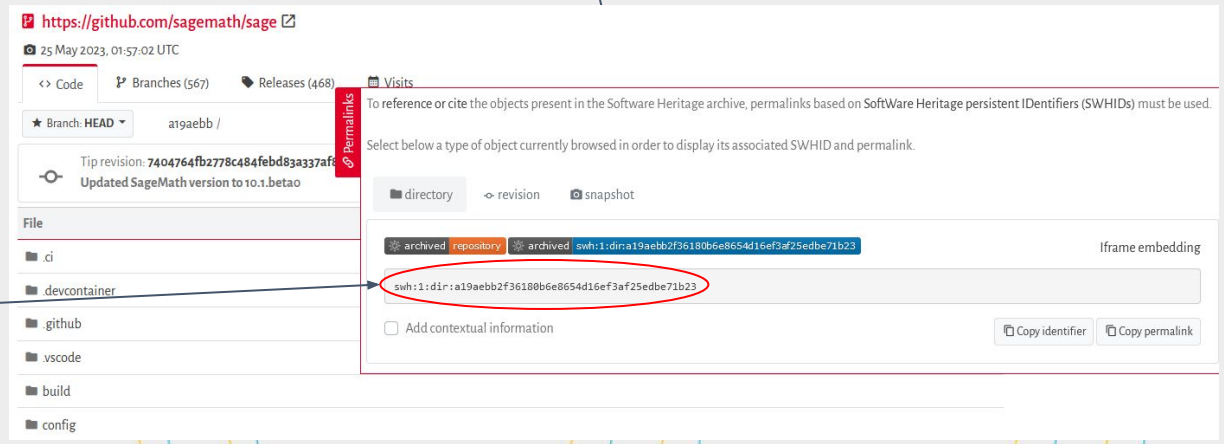
eosc | FAIRCORE4EOSC
Core Components Supporting a FAIR EOSC

swMATH & SWH

- swMATH has started using the SWH API to archive GitHub repositories for mathematical software
- The SWH API provides saving methods we used for our database
- See : https://github.com/zbMATHOpen/SwhSaveNowBatch



SWHID



Funded by the European Union

eosc | FAIRCORE4EOSC
Core Components Supporting a FAIR EOSC

Component Overview
Archive, Reference, Describe and **Cite**

Scholarly repositories:

- **InvenioRDM - SWH (CERN)**
- **DataVerse - SWH (KNAW-DANS)**

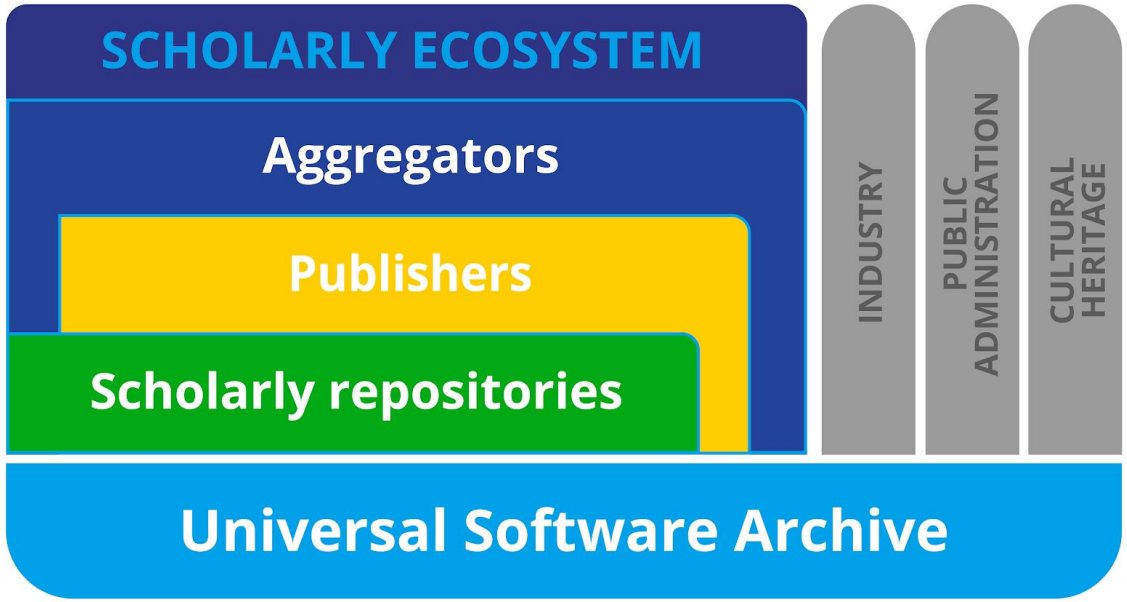
Publishers:

- **Dagstuhl - SWH (LZI)**
- **Episciences - SWH (INRIA)**

Aggregators:

- **swMATH - SWH (FIZ)**
- **OpenAire - SWH (OPENAIRE)**

RSAC
EOSC Research Software APIs & Connectors



SIRS report: European Commission, Directorate-General for Research and Innovation, *Scholarly infrastructures for research software : report from the EOSC Executive Board Working Group (WG) Architecture Task Force (TF) SIRS*, Publications Office, 2020, **https://data.europa.eu/doi/10.2777/28598**
Video: EOSC Software Infrastructures for Research Software: J. B. Gonzalez Lopez (CERN)

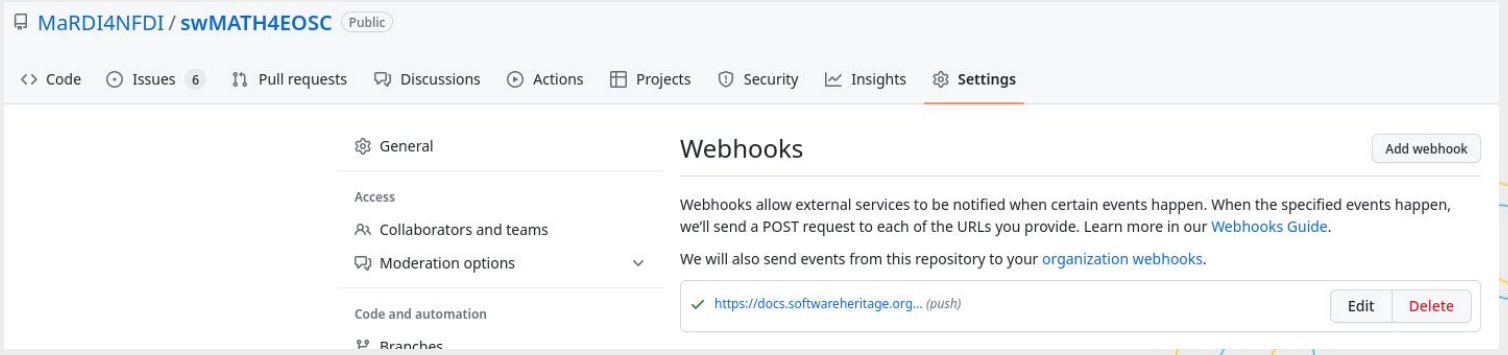
swMATH future plans with the RSAC components

Making Mathematical Software and their Metadata Valuables to Scholars

- **FAIRCORE4EOSC** will support 9 components, including the Research Software APIs & Connector (**RSAC**) component, to make the **European Open Science Cloud** a *FAIR* infrastructure.
- **swMATH** will be publicly exposed thanks to a *Mediawiki* instance and deployed on the **MaRDI4NFDI** infrastructure
- **swMATH** will be a stakeholder of the **RSAC** component co developed with **Software Heritage**

The SWH WebHook

- This feature leaves use to safely archive your software at each step of its evolution
- A real plug and play technology!
- swMATH uses the SWH Webhook to automatically archive the features we develop for FAIRCORE4EOSC:



Funded by
the European Union

eosc | FAIRCORE4EOSC
Core Components Supporting a FAIR EOSC

A live demo with Shiraz now!

Funded by
the European Union

eosc | FAIRCORE4EOSC
Core Components Supporting a FAIR EOSC

Q&A Session

Funded by the European Union

Contact: Maxence Azzouz-Thuderoz (maxence@zbmath.org)