# Resource Summary Report

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## Finite Element Toolkit

RRID:SCR_008682
Type: Tool

### Proper Citation

Finite Element Toolkit (RRID:SCR_008682)

### Resource Information

**URL:** http://www.fetk.org/

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**Description:** The Finite Element ToolKit (FETK) is a collaboratively developed, evolving collection of adaptive finite element method (AFEM) software libraries and tools for solving coupled systems of nonlinear geometric partial differential equations (PDE). The FETK libraries and tools are written in an object-oriented form of ANSI-C and in C , and include a common portability layer (MALOC) for all of FETK, a collection of standard numerical libraries (PUNC), a stand-alone high-quality surface and volume simplex mesh generator (GAMer), a stand-alone networked polygon display tool (SG), a general nonlinear finite element modeling kernel (MC), and a MATLAB toolkit (MCLite) for protyping finite element methods and examining simplex meshes using MATLAB. The entire FETK Suite of tools is highly portable (from iPhone to Blue Gene/L), thanks to use of a small abstraction layer (MALOC) and heavy use of the GNU Autoconf infrastructure. The primary FETK ANSI-C software libraries are: :- MALOC is a Minimal Abstraction Layer for Object-oriented C/C programs. :- PUNC is Portable Understructure for Numerical Computing (requires MALOC). :- GAMer is a Geometry-preserving Adaptive MeshER (requires MALOC). :- SG is a Socket Graphics tool for displaying polygons (requires MALOC). :- MC is a 2D/3D AFEM code for nonlinear geometric PDE (requires MALOC; optionally uses PUNC GAMER SG). Application-specific software designed for use with the FETK software libraries is: :- GPDE is a Geometric Partial Differential Equation solver (requires MALOC PUNC MC; optionally uses GAMER SG). :- APBS is an Adaptive Poisson-Boltzmann Equation Solver (requires MALOC PUNC MC; optionally uses GAMER SG). :- SMOL is a Smoluchowki Equation Solver solver (requires MALOC PUNC MC; optionally uses GAMER SG). MATLAB toolkits designed for use with MC and SG or as standalone packages: :- MCLite is a simple 2D MATLAB version of MC designed for teaching. :- FEtkLAB is a sophisticated 2D MATLAB adaptive PDE solver built on top of MCLite. Related packages developed and maintained by FETK developers (included in PUNC above): :- PMG is a Parallel Algebraic MultiGrid code for general semilinear elliptic equatons. :- CgCode is a package of Conjugate gradient Codes for large sparse linear systems. Sponsors: This resource is developed and supported by the MCP Research

Group at the UCSD Center for Computational Mathematics.

**Synonyms:** FETK

**Resource Type:** software resource, software toolkit

**Keywords:** element, differential equation, geometric, library, modeling, nonlinear, software, tool, toolkit, volume

**Resource Name:** Finite Element Toolkit

**Resource ID:** SCR_008682

**Alternate IDs:** nif-0000-33758

**Record Creation Time:** 20220129T080248+0000

**Record Last Update:** 20260912T200238+0000

## Ratings and Alerts

No rating or validation information has been found for Finite Element Toolkit.

No alerts have been found for Finite Element Toolkit.

## Data and Source Information

**Source:** SciCrunch Registry

## Usage and Citation Metrics

We found 5 mentions in open access literature.

**Listed below are recent publications.** The full list is available at kravitz2 .

Hake J, et al. (2012) Modelling cardiac calcium sparks in a three-dimensional reconstruction of a calcium release unit. The Journal of physiology, 590(18), 4403.

Kekenes-Huskey PM, et al. (2012) Modeling effects of L-type ca(2+) current and na(+)-ca(2+) exchanger on ca(2+) trigger flux in rabbit myocytes with realistic T-tubule geometries. Frontiers in physiology, 3, 351.

Cheng Y, et al. (2007) Finite element analysis of the time-dependent Smoluchowski equation for acetylcholinesterase reaction rate calculations. Biophysical journal, 92(10), 3397.

Zhang D, et al. (2005) Tetrameric mouse acetylcholinesterase: continuum diffusion rate calculations by solving the steady-state Smoluchowski equation using finite element methods. Biophysical journal, 88(3), 1659.

Song Y, et al. (2004) Continuum diffusion reaction rate calculations of wild-type and mutant mouse acetylcholinesterase: adaptive finite element analysis. Biophysical journal,

87(3), 1558.