

SUPPLEMENTARY MATERIALS: A SEMI-ANALYTIC DIAGONALIZATION FEM FOR THE SPECTRAL FRACTIONAL LAPLACIAN

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SM1. Convergence Figures. The convergence results from Subsection 5.1 shown in Table 1 are presented visually in Figure SM1 and from Table 2 in Figure SM2.

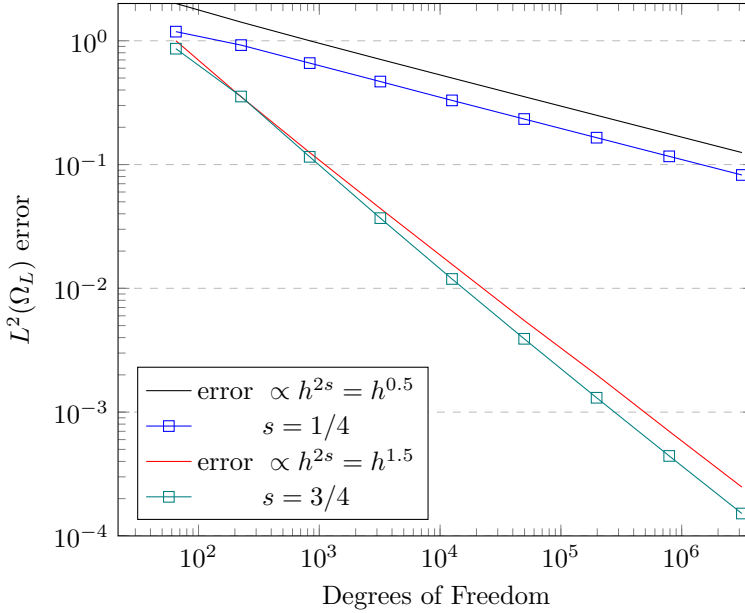


FIG. SM1. Error in the $L^2(\Omega_L)$ norm versus the number of degrees of freedom using \mathbb{Q}_1 finite elements for $s = 1/4$ and $s = 3/4$ on uniformly refined meshes of Ω_L .

SM2. Computation Details and Reproducibility. All numerical experiments were conducted using a single node with dual sockets using Intel Xeon Gold 6246R processors running at 3.40 GHz with a total of 628 GB of RAM. The node was running Fedora release 36 configured with Linux kernel 6.2.13. All libraries and source code were compiled using GCC version 12.2.1. The source code for `deal.ii` and its dependencies were built using the `candi` system, available at

<https://github.com/dealii/candi>

Versions for all libraries used are given in Table SM1.

The source code for the numerical algorithm is available at

<https://github.com/shedsaw/Exact-Diagonalization-Tensor-FEM>.

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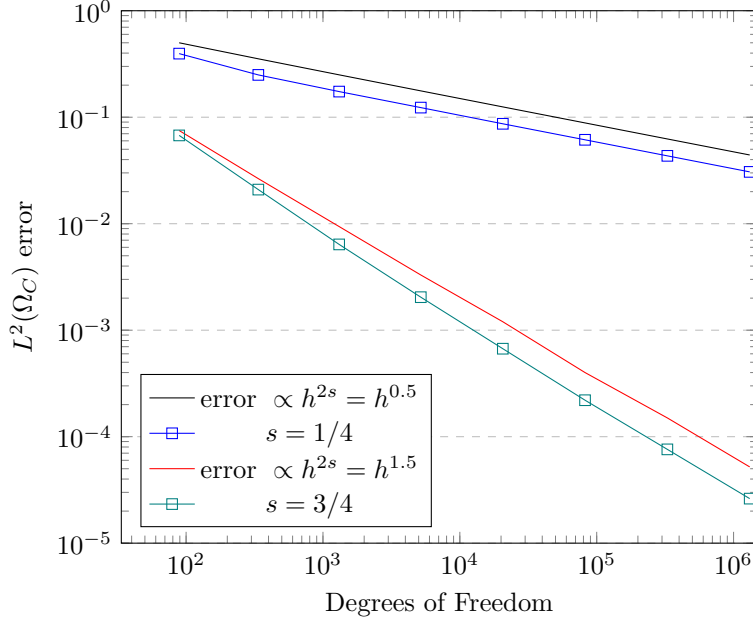


FIG. SM2. Error in the $L^2(\Omega_C)$ norm versus the number of degrees of freedom using \mathbb{Q}_1 finite elements for $s = 1/4$ and $s = 3/4$ on uniformly refined meshes of Ω_C .

TABLE SM1
Library versions.

OpenMPI	4.1.5	NetCDF	4.7.4
METIS	5.1.0	Numdiff	5.9.0
deal.ii	9.4.2-r3	Oce-OCE	0.18.3
adloc	2.7.3	OpenBLAS	0.3.17
ARPACK-NG	3.8.0	P4est	2.3.2
assimp	4.1.0	ParMETIS	4.0.3
astyle	2.04	PETSc	3.16.4
boost	1.63.0	Scalapack	2.1.0
bzip2	1.0.6	SLEPc	3.16.2
Cmake	3.20.5	Sundials	5.7.0
Ginkgo	1.4.0	SuperLU Dist	5.1.2
Gmsh	4.8.4	Symengine	0.8.1
GSL	2.6	Trilinos Release	13.2.0
HDF5	1.10.8	Zlib	1.2.8
Mumps	5.4.0.5		