Code Outline

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This is an outline for the code to be written. Ignore the saving of states for now, that's a later problem. Possibly keep the saving of the external field.

Some main script A script for execution, but some of the scripts below should be callable separately.

Magnetic field generation This should save magnetic fields as a separate file to be read, numpy has native savefiles.

Eigenvalue approximation This is calling some eigenvalue-finding function on the matrix in question. For unique identification the energies are assumed to never cross.

Eigenstate calculation Returns eigenfunctions to the fast Hamiltonian, the same function as above?

Gauge field calculation This acts the differentiated matrix on the eigenstates and thus calculates the synthetic scalar potential, save to file.

Acceleration function A function to return the acceleration for some set of parameters, i.e. the function used in the ODE solver. This is big. Takes external field, coordinate velocities, coordinates. Calls calculation of eigenvalues and eigenstates in neighbouring sites, gauge field calculation.

ODE solver This should integrate the acceleration to generate the path traversed.

Visualization This will be some visualisation of the result, as fancy as possible. If time permits animation is a possibility. If parameter space is done the monopoles could perhaps be shown as well.

Data treatment can be done in xarray so that labels can be used in arrays. This turns out to be ineffective, switch back to full numpy ithink

TODO: index field after position not point, and modify the rest of the code accordingly