Comments on self-energy methods (self_energy.py)

Eigendecomposition

Crash due to non-quadratic matrix

Two modes that are non-degenerate are considered degenerate due to numerical inaccuracies. This means that the comparison fails due to a epsilon bound that is too big. Diagonalising the subspace gives wrong results and removes solutions. This will lead to a non-quadratic matrix that will crash at the inversion step.

Solution:

Play around with the value for epsilon in the comparison of the real and imaginary parts inside the private method `self.__degeneracy_checker`.

Crash due to singular matrix

At some special energies the matrix of evanescent and propagating solutions is singular. The code will crash with the error code of a singular matrix that is non-invertible.

Solution:

Shift the energy a little bit away from the numerically unstable region.