<https://en.wikipedia.org/wiki/Condition_number>

<http://www.alglib.net/matrixops/rcond.php>

<https://cseweb.ucsd.edu/classes/fa04/cse252c/sakumar.pdf>

<https://en.wikipedia.org/wiki/Singular_value_decomposition>

<https://www.cs.cmu.edu/~venkatg/teaching/CStheory-infoage/book-chapter-4.pdf>

http://www.cs.utexas.edu/~henear/works/2016posterprint.pdf

There are many ways to approximate the condition number of a matrix. The official formula is ||A||\*||A^-1||, however computing this formula is not generally used since computing ||A^-1|| would essentially already solve the problem.

One method for approximating the condition number of a matrix is to compute the largest and smallest eigenvector of A, and then compute |λmax|/| λmin|.

Another method used to approximate the condition number is simply to approximate the norms of A and A^-1, and then use these estimates directly in the actual formula ||A||\*||A^-1||. A common method used to approximate the norms of A is b singular value decomposition.

A third method sometimes used is based on hager’s method. This method can estimate the 1-norm for the matrix A and A^-1, and once again these estimates directly used in the actual formula ||A||\*||A^-1||.