

# Generalized Inverses and Underdetermined Systems

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Hi,

Suppose you have an underdetermined system of linear equations (so number of eqns < number of vars), which can be solved. Normally, of course, such a system produces an infinite number of solutions which can be written in a parametrized form.

Recently, I was reading a book where the author used the Moore–Penrose inverse to solve an undetermined system of linear equations. I know that it can be used to solve such a system, but I am wondering why one would want to use it. I'm used to seeing the MP inverse for the solution of least–squares problems where the system is overdetermined instead of undetermined. Here you'd use the MP inverse because it minimizes the residual of interest, but for an underdetermined system, the residual should be zero, since a solution does exist. Does this approach minimize another norm (such as that of the solution set)?

TIA,

Juno

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