

1096-F1-1538 **Gilbert Strang***, Dept. of Mathematics, MIT, Cambridge, MA 02139. *Analogies between matrix equations and linear differential equations.*

This talk is pedagogical. It is about connecting two basic courses —differential equations and linear algebra. Students who don't have much time (engineers, scientists, economics majors, ...) still need to see both.

One important connection is the structure of solutions to all linear equations: “particular solution” plus all “nullspace solutions”.

Another link comes from $AA^{-1} = I$. The columns of A^{-1} are like the solutions to differential equations (when the right hand side is a delta function).

Finally: A second order equation has a 2-dimensional nullspace (which explains why there are 2 initial conditions). But what is the “row space” of a differential operator with no rows? (Received September 16, 2013)