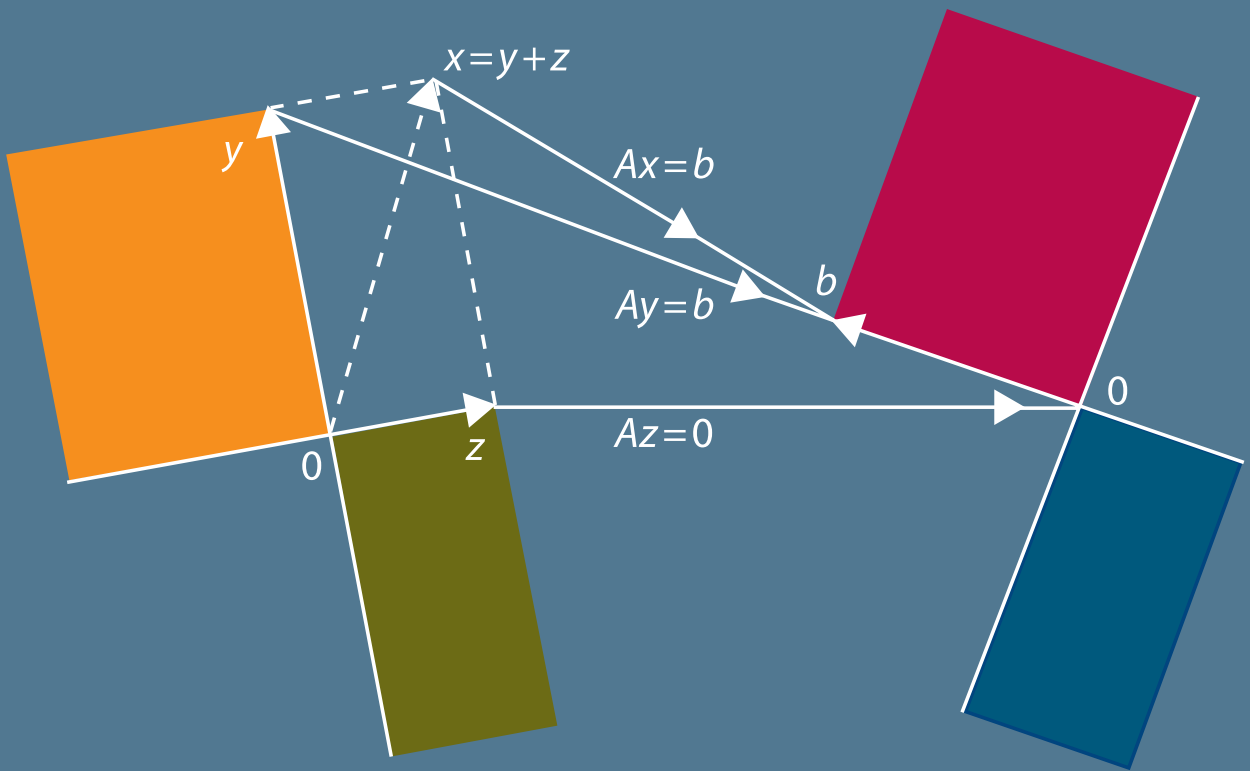
Introduction to

LINEAR ALGEBRA

SIXTH EDITION



GILBERT STRANG

INTRODUCTION TO LINEAR ALGEBRA

Sixth Edition

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The website for this book (with Solution Manual) is **math.mit.edu/linearalgebra**
2020 book : **Linear Algebra for Everyone** (**math.mit.edu/everyone**)
2019 book : **Linear Algebra and Learning from Data** (**math.mit.edu/learningfromdata**)
2014 book : **Differential Equations and Linear Algebra** (**math.mit.edu/dela**)

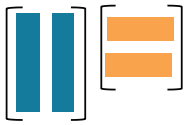
Linear Algebra is included in MIT's OpenCourseWare **ocw.mit.edu/courses/mathematics**
Those videos (including 18.06SC and 18.065) are also on **www.youtube.com/mitocw**
18.06 Linear Algebra 18.06SC with problem solutions 18.065 Learning from Data

The cover design was created by Gail Corbett and Lois Sellers : **lsellersdesign.com**

Kenji Hiranabe contributed **The Five Factorizations** and **Matrix World**

The Five Factorizations of a Matrix

$A=CR$

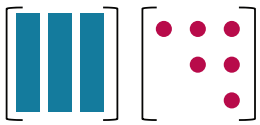


C First r independent columns of A
R Combines the columns in C to produce all columns in A

$A=LU$

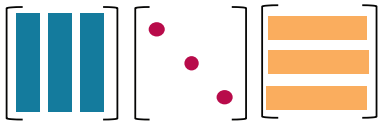
L Lower triangular matrix/all ones on the diagonal
U Upper triangular matrix/no zeros on the diagonal

$A=QR$



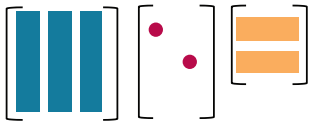
Q Columns are orthogonal unit vectors
R Triangular R combines those orthonormal columns of Q to produce the columns of A

$S=Q\Lambda Q^{T}$
$SQ=Q\Lambda$



Q Columns of Q are orthonormal eigenvectors of S
Λ Diagonal matrix: Real eigenvalues of S

$A=U\Sigma V^{T}$
$AV=U\Sigma$



U Orthonormal singular vectors (outputs from A)
Σ Diagonal matrix: Positive singular values of A
V Orthonormal singular vectors (inputs to A)

This is the textbook that goes with Gilbert Strang's video lectures on *ocw.mit.edu*.

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