Practical Linear Algebra: A Geometry Toolbox, Third edition
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Mathematica Files supporting concepts in the text

	Chapter Name	Filename	Concept
Chapter 1	Descartes' Discovery		
		Local2Global	Visualize local to global coordinate transformation
Chapter 2	Here and There: Points and Vectors in 2D		
		VectorField	Explore vector field options in Mathematica
		VectorLength	Visualize the length of a vector
		BarycentricCoordinates	Demonstrate barycentric coordinates on a line and in a triangle
		LinearCombinations	Visualize linear combinations of vectors
		DotProduct	Visualize the dot product of two vectors: one fixed and one variable
Chapter 3	Lining Up:2D Lines		
		ParametricLine	Visualize a parametric line defined by a point and a vector
Chapter 4	Changing Shapes: Linear Maps in 2D		
		Projections	Orthogonal and oblique projections constructed and visualized
		Determinants	Visualize the determinant of two vectors: one fixed and one variable
		ActionEllipse	Visualize the action ellipse resulting from a linear map applied to unit vectors
		MatrixProductCommute	Demonstrate that matrix products do not commute in general
		MatrixPowers	Visualize the action ellipse for powers of a matrix
		MatrixTranspose	Visualize the action ellipse of a matrix and its transpose
Chapter 5	2 x 2 Linear Systems		
		LinearSystemRowView	Visualization of linear systems viewed as line intersection problems
		LinearSystemsBasics	Linear combination problem restated as a linear system
Chapter 6	Moving Things Around: Affine Maps in 2D		
		ComposingAffineMaps	Repeated application of an affine map to points on a circle
Chapter 7	Eigen Things		
		EigenDecomp	Eigendecomposition of a symmetric 2x2 matrix and interpretation of action of matrix as a linear combination of projection matrices.
		QuadraticForms	Visualize the quadratic form of a positive definite matrix and the ellipse in a planar section; also visualization of the action ellipse and its major and minor axes
		QuadraticForms2	Visualize quadratic form and special planar slices; visualize action ellipse
		NullSpace	Visualize the null space for a rank 2 3x3 matrix
Chapter 8	3D Geometry		
		HedgehogPlot	Normals plotted at centroid of facets of a 3D object
Chapter 9	Linear Maps in 3D		
		LinearMaps3D	Linear maps applied to 3D objects
		Projections3D	Visualize an orthogonal and oblique projection; construct a projection into a plane given two orthonormal vectors defining the plane
		RotateAroundVector	Rotate a point about an arbitrary vector; demonstrate 3 methods to compute; visualize
		LinearCombinations3D	Visualize linear combinations of 3 vectors in 3D
		ActionEllipsoid	Visualize the action ellipsoid for a 3x3 matrix
		Subspace	Visualizes the subspace defined by two vectors in 3D
		Rank	Visualize the result of applying a rank 2 matrix to three 3D vectors
		Determinants3D	Visualize the determinant of a parallelepiped
Chapter 10	Affine Maps in 3D		
Chapter 11	Interactions in 3D		
Chapter 12	Gauss for Linear Systems		
		LSQline	Fit a least squares line to data using the normal equations
		LUDecomposition	LU decomposition to solve a linear system
		PolyInterp	Polynomial interpolation as an application of linear systems
		LSQ_SphereFit	Least squares sphere fit to input vectors
Chapter 13	Alternative System Solvers		
		ConditionNumber	Examine the condition number and determinant of several examples
		Householder	Solve a linear system using the Householder method. Construct the Householder matrix one column at a time to aid in understanding the method.
		HouseholderLSQ	Same as Householder except it handles overdetermined linear systems in order to find the least squares solution
		MatrixNorms	Check popular matrix p-norms and test accuracy of 2-norm estimate using vector norm
Chapter 14	General Linear Spaces		
		InnerProduct	Compare the dot product with a "made up" inner product
Chapter 15	Eigen Things Revisited		
		GoogleEigenvector	From an input adjacency matrix, find the Google eigenvector and highest ranking webpage
		PowerMethod	Implementation of the power method
Chapter 16	The Singular Value Decomposition		
		LSQ_PseudoInverse	Find the least squares solution using the pseudoinverse
		SVDActionMatrices	Visualize the action ellipses for a given matrix M, M.M^T, and M^T.M --- latter two are the building blocks of the SVD for M
		PCA	Principal Components Analysis applied to 2D input data; Quadratic form of covariance matrix visualized also
		SVD_2x2_plot	Plot the action of the elements of the SVD
		SVD_basics	Compute the SVD of input matrix m two ways: Mathematica and via m.m^T and m^T.m
		Pseudoinverse	Compute the pseudoinverse of a matrix and use it to find the least squares solution to an overdetermined linear system
		SVD_dims	Visualize the dimensions of the elements of the SVD
		SVD_graphics3D	Visualize the action of the elements of the SVD -- V^T, Sigma.V^T, and U.Sigma.V^T -- on a point set
		SVD_ImageCompression	Demonstrate image compression using SVD
Chapter 17	Breaking It Up: Triangles		
		TriangulatedSurface	Plot a 3D triangulated surface
Chapter 18	Putting Lines Together: Polylines and Polygons		
		IsoparametricCurves	Display the isoparametric curves for a parametric surface
		TrimmedSurface	Plot a trimmed surface
Chapter 19	Conics		
		ConesConics	Create conics from a cone/plane intersection
		Conics	Create conics as contours of quadratic functions
Chapter 20	Curves		
		BilinearBezier	Bilinear Bezier surface and trimmed surface display
		BsplineSurf	B-spline surface display, isoparametric line display, interpolation (Outside scope of text)