Eigen

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g++ name_of_file.cpp -I/usr/include/eigen3 -lmgl -std=c++11; ./a.out

using namespace Eigen; (Do this after #include)

#include <eigen3/Eigen/Dense> or <Eigen/Dense>

Eigen	What it does
Vector2d x	Vector (a,b)
MatrixXd A(2,3)	A = (. . . / . . .)
v.size()	e.g. len of v. (1,2,3) => 3
A(0,1) = 3;	(. 3 . / . . .)
x = A.lu().solve(b);	solve for x in Ax=b
A.transpose();	A^T
MatrixXd A(MatrixXd::Identity(5,5))	Identity Matrix 5x5
c = min(a,b)	Minimum of a und b is stred in c
A.rows()	#rows of A
A.cols()	#columns of A
A.col(3) = x	A = [▯ ▯ ▯]
A.colwise() -= meanFace	subtract meanFace from every column in A.
cout << A	Prints out A
x[i]	Access ith element of a Vector that is type CONST
MatrixXd A	
VectorXd c = VectorXd::Ones(n);	c = (1,1,1,1,...)
std::pow(v[i],2)	$v[i]^2$

LLT<MatrixXd> lltofA(A); Computes Cholskey $A=LL^T$ for A. name

MatrixXd L = lltOfA.matrixL(); Gets factor L of Cholskey name

X = L.triangularView<Lower>().solve(B); Solve for X in $L \cdot X = B$ where L is lower-Triangular and X can be a Matrix.

HouseholderQR<MatrixXd> qr(A); Computes Householder QR of A.
Q = qr.householderQ(); Get Q
R = qr.matrixQR.triangularView<Upper>(); Get R

Rthin = MatrixXd::Identity(min(m,n), m) * R Get thin Q // if m>n then you can replace min(m,n) with n
Qthin = Q * MatrixXd::Identity(m, min(m,n)) Get thin R // //

JacobiSVD<MatrixXd> svd(A);
V = svd.singularValues();
U = svd.matrixU();
V = svd.matrixV();

v.norm()	// Take the $\|v\|_2$ norm of v
vector.segment(i,j)	// returns a reference to the segment of vector starting from i with length j.
Matrix.diagonal()	// returns a vector reference to the diagonal of the matrix.
Matrix.diagonal(1) (or -1)	// returns a vector reference to the diagonal of the matrix moved by 1 (bzw. -1).
vector.head(i)	// returns a reference to the first i elements of vector.
vector.tail(i)	// returns a reference to the last i elements of vector (order remains unchanged)
MatrixOR vector.cwise Quotient(MatrixOR vector2) / Product(MatrixOR vector2)	// self explanatory.

Don't know what happens if not same size