

## Exercise: linear and quadratic regression

- Write `c = linear_regression(x,y)` for data  $(x_i, y_i)$ ,  $i = 1, \dots, m$ . Use  $p(x) = c_0 + c_1x$ , construct  $V = [\mathbf{1}, x]$  and solve  $V^T V c = V^T y$ .
- Load `least_squares_data.mat` (provided with these slides). Inspect the variable names and dimensions with `whos`; arrange  $x, y$  as column vectors. Plot the data and fitted line.
- Write `c = quadratic_regression(x,y)` with  $V = [\mathbf{1}, x, x.^2]$  and plot the quadratic fit.
- Require full column rank (at least two distinct abscissae for a line, three for a quadratic). Compare coefficients and residuals with MATLAB `V\y`, which avoids forming the normal equations.