Why

A simple example of an embedding.[1]

Definition

Fix $d \in \mathbf{N}$. A *polynomial feature map* of degree d is a function $\phi : \mathbf{R} \to \mathbf{R}^d$ with

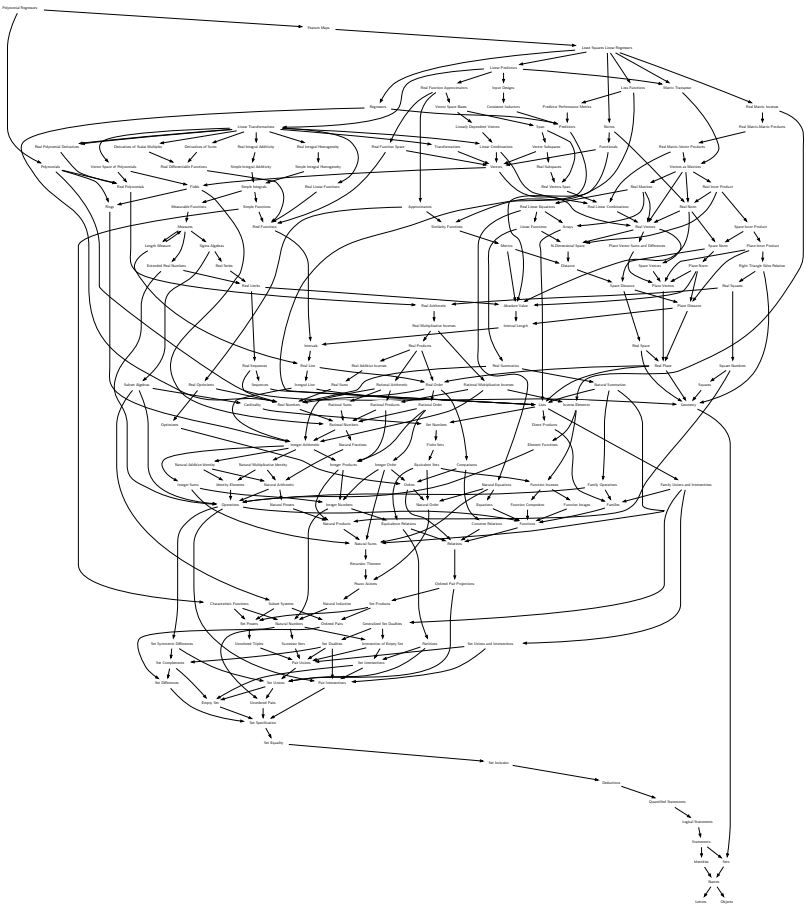
$$\phi(x) = \begin{pmatrix} 1 & x^2 & \cdots & x^d \end{pmatrix}^\top .$$

For $x \in \mathbf{R}$, we call $\phi(x)$ the *polynomial embedding* of x.

A *polynomial regressor* is a least squares linear predictor using a polynomial feature embedding (of any degree, but to be precise one must specify the degree). The task of consructing a linear predictor is often referred to as *polynomial regression*.

Given a dataset of paired records $(x^1, y^1), \ldots, (x^n, y^n) \in \mathbf{R}^2$, one can construct a predictor $g : \mathbf{R} \to \mathbf{R}$ for y by embedding the dataset $(\phi(x^1), \ldots, \phi(x^n))$ and finding the least squares linear regressor $f : \mathbf{R}^d \to \mathbf{R}$ for y. One defines the predictor $g : \mathbf{R} \to \mathbf{R}$ by $g(\phi(x))$.

[1] Future editions will expand, or perhaps collapse this sheet.


Polynomial Regressors
Feature Maps
Least Squares Linear Regressors
Linear Predictors
Regressors
Multivariate Linear Regressors
Input Images
Linear Functions
Matrix Transpose
Real Matrix Inverse
Vector Space Basis
Constraint Solutions
Predictor Performance Metrics
Linear Transformations
Linear Dependent Inverse
Inner
Projections
Norms
Real Matrix Inverse Products
Real Polynomial Derivatives
Derivatives of Scalar Multiples
Derivatives of Sums
Real Integral Additivity
Real Integral Homogeneity
Real Function Space
Transformations
Linear Combinations
Vector Subtraction
Normalizations
Real Matrix Inverse Products
Polynomials
Vector Space of Polynomials
Real Differentiable Functions
Simple Integral Additivity
Simple Integral Homogeneity
Matrix
Real Vectors
Inner Product
Real Matrix Inverse Products
Real Polynomials
Fields
Matrix Integrals
Real Linear Functions
Real Vector Norm
Real Matrix
Matrix Inner Product
Prime
Measurable Functions
Simple Functions
Approximations
Real Linear Regressors
Multivariate Combinations
Real Norms
Real Functions
Real Functions
Similarity Functions
Linear Functions
Linear
Real Vectors
Symmetric Product
Metrics
Length Measure
Signed Algebras
Inner Product
Metrics
Vector Space
Positive Inner Product
Extended Real Numbers
Real Sets
Distance
Inner Product
Positive Inner Product
Right Triangle Meta-Relation
Real Lists
Real Lists
Real Intervals
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