**Multiple Features**

**Note:** [7:25 - *θT* is a 1 by (n+1) matrix and not an (n+1) by 1 matrix]

Linear regression with multiple variables is also known as "multivariate linear regression".

We now introduce notation for equations where we can have any number of input variables.

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| *xj*(*i*) = value of feature *j* in the *i*th training example  *x*(*i*) = the input (features) of the *i*th training example  *m* = the number of training examples  *n* = the number of features |

The multivariable form of the hypothesis function accommodating these multiple features is as follows:

*hθ*(*x*) = *θ*0 + *θ*1*x*1 + *θ*2*x*2 + *θ*3*x*3 + ⋯ + *θnxn*

In order to develop intuition about this function, we can think about *θ*0 as the basic price of a house, *θ*1 as the price per square meter, *θ*2 as the price per floor, etc. *x*1 will be the number of square meters in the house, *x*2 the number of floors, etc.

Using the definition of matrix multiplication, our multivariable hypothesis function can be concisely represented as:

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|  |

This is a vectorization of our hypothesis function for one training example; see the lessons on vectorization to learn more.

Remark: Note that for convenience reasons in this course we assume *x*0(*i*) = 1 for (i∈1 ,…, *m*). This allows us to do matrix operations with theta and x. Hence making the two vectors 'θ' and *x*(*i*) match each other element-wise (that is, have the same number of elements: n+1).]