Whitney's Extension Problem

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The course will present recent results on the following problems:

Fix positive integers m,n. Let f be a real-valued function defined on an (arbitrary) given subset E of R^n. How can we decide whether f extends to a function F in $C^m(R^n)$?

If F exists, then how small can we take its C^m norm? What can we say about the derivatives of F up to order m at a given point? Can we take F to depend linearly on f?

Suppose the above subset E is finite; say E contains N points. How can we compute an F as above, with C^m norm close to least possible? How many computer operations does it take? Suppose we are allowed to delete a few points from the set E. Which points should we remove to minimize the C^m norm of the resulting F?

What if the space $C^m(R^n)$ is replaced by a Sobolev space?