Multiplier Methods and Splitting in Convex Optimization

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The proximal method of multipliers, now also known as the proximal augmented Lagrangian method, was originally introduced in 1976 as an application of the proximal point algorithm for finding a zero of a monotone mapping. However, according to a 2014 paper of Teboulle, it can also be seen as the basis for most of the celebrated schemes for problem decomposition or splitting in convex optimization. In a new advance, the method has been shown to converge typically at a linear rate even in a sort of variable metric extension with inexact minimization in the steps. That extension moreover enables translation of the results to the territory of the progressive decoupling algorithm and its diverse specializations. In particular, decomposition can be carried out with the augmented Lagrangian itself decomposed.