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On Bauschke-Bendit-Moursi modulus of averagedness and classifications of averaged nonexpansive operators

Averaged operators are important in Convex Analysis and Optimization Algorithms. We propose classifications of averaged operators, firmly nonexpansive operators, and proximity operators by using the Bauschke-Bendit-Moursi modulus of averagedness. We show that if a resolvent has modulus of averagedness less than $1/2$, then it is a bi-Lipschitz homemorphism. Amazingly the proximity operator of a convex function has its modulus of averagedness less than $1/2$ if and only if the function is Lipschitz smooth. Joint work with Shuang Song.