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An Operator Splitting View of Federated Learning

Federated learning (FL) has recently emerged as a massively distributed framework that enables training a shared or personalized model without infringing user privacy. In this work, we show that many of the existing FL algorithms can be understood from an operator splitting point of view. This unification allows us to compare different algorithms with ease, to refine previous convergence results and to uncover new algorithmic variants. In particular, our analysis reveals the vital role played by the step size in FL algorithms. The unification also leads to a streamlined and economic way to accelerate FL algorithms, without incurring any communication overhead. We perform numerical experiments on both convex and nonconvex models to validate our findings.