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Numerical resolution of McKean-Vlasov FBSDEs using neural networks

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Abstract: We propose several algorithms to solve McKean-Vlasov Forward Backward Stochastic Differential Equations. Our schemes rely on the approximating power of neural networks to estimate the solution or its gradient through minimization problems. As a consequence, we obtain methods able to tackle both mean field games and mean field control problems in high dimension. We analyze the numerical behavior of our algorithms on several examples including non linear quadratic models. This is a joint work with Joseph MIKAEL (EDF R&D) and Xavier WARIN (EDF R&D, FIME).

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