Finite differences Least Square Methods for HJB using NN

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Annotations

- We are minimizing costs of the form

$$\mathcal{I}(u) = \mathcal{L}(u; g) + \mathcal{R}(u)$$

  where

$$\mathcal{L}(u; g) := \int_{\partial\Omega} (u(x) - g(x))^2 \, dx$$

  and

$$R(u) := \int_{\Omega} \left(\widehat{H}(x, D_\delta^+ u(x), D_\delta^- u(x)) \right)^2 dx.$$

  They affirm that any global minimizer of this cost is a viscosity solution, and that any critical point is a local minimizer. The second property is more intersting.

0.1 Questions

- Do all equations of the form

$$H(x, \nabla u^\varepsilon(x)) - \varepsilon \Delta u^\varepsilon(x) = 0$$

  have smooth solutions? Why not just take a very small ε?