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# Mixed-integer quadratic programming formulations for computing the Lipschitz constant of ReLU networks

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## — Abstract —

The Lipschitz constant of a neural network is a useful metric to get information about the robustness of a trained network. Its exact calculation is however NP-hard even for one hidden layer ReLU networks. In this presentation, by taking into account activation regions at each layer as new constraints, we propose new quadratically constrained mixed-integer programming

formulations for the neural network Lipschitz estimation problem. The solutions of these problems give lower bounds and/or upper bounds of the Lipschitz constant. We give some experiments to compare the proposed approach with State Of the Art algorithms to estimate the Lipschitz constant of a neural network.

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