Many n-variable functions can be quadratized with only 1 auxiliary variable

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We recently proved that all 4-variable functions of binary variables with real-valued coefficients, can be perfectly quadratized with only 1 auxiliary variable. We now prove that a significant class of n-variable functions with negative coefficients can also be perfectly quadratized with only 1 auxiliary variable, regardless of how large n is.

I. INTRODUCTION

II. RESULTS

$$b_a \left(\sum_j a_j \left(\sum_{i \in j} b_i - |j| + 1 \right) \right) \tag{1}$$

III. EXAMPLES

IV. DISCUSSION

V. ACKNOWLEDGMENTS