Complexity analysis of the primal-dual interior point method for second-order cone optimization problem

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The purpose of this talk is to extend the Bai et al.'s complexity results for a linear program to a second-order cone optimization (SOCO) problem. We define a proximity function for SOCO by a kernel function introduced by Bai et al. [SIAM J. Optim., 13(2003), 766-782] and using the proximity function, we formulate an algorithm for a large-update primal-dual interior-point method (IPM) for SOCO and give its complexity analysis, and then we show that the worst-case iteration bound for our IPM is $\mathcal{O}(\sqrt{N}\log N\log\frac{N}{\epsilon})$.