

North Carolina State University  
Operations Research

OR 601/801

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218 Daniels Hall  
4:30 pm

**The Nearest Point Problem in a Polyhedral Cone and Its Extensions**

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**Abstract**

The problem of finding the nearest point in a polyhedral cone to a given point in  $n$ -dimensional space can be formulated as a convex quadratic programming problem (CQP) with special structure. This problem has applications in a wide range of areas, such as robotics, computer graphics, optimal control, and stochastic programming.

In this research we study the geometrical structure of the nearest point problem in a polyhedral cone, investigate its relationship with the nearest point problem in a pos cone, and propose an efficient algorithm for solving this problem. We refer to this algorithm as the *active index algorithm*. Furthermore, we show how we can use the active index algorithm to solve an instance of the nearest point problem in a polyhedral set. And finally we show how to extend the reach of this algorithm to solve any strictly convex quadratic programming problem with linear inequality constraints.

In addition, we construct a large collection of instances using random data generator, solve those instances using our proposed algorithm as well as a commercial solver, Cplex 11, and compare the corresponding execution time.

**Refreshments will be served in Daniels Hall Room 401 starting at 4:00 p.m.**