kinetic friction is determined mainly by the viscosity of the liquid lubricant (Reynolds, 1886). In the present
article we discuss only the case of boundary lubrication, when the substrates are separated by a thin (a few atomic diameters) lubricant film. The case of "dry friction" also belongs to this class. The boundary lubrication is obviously the most important in micromachines. However, even in the macromachines where the hydrodynamic friction operates typically, the boundary lubrication is also important at stop/start moments, when the lubricant is squeezed out from the contact area and the surfaces come into direct contact.

Because tribology is an extremely important branch of material science, at least several review papers are published every year. Some of the works are devoted mainly to tribological experiments, others are more concentrated on theoretical or simulation aspects of the problem. In any case I cannot claim to present a whole picture of the problem. My goal in this work is to give sight into the problem from physicists working in surface science and, moreover, mainly on theoretical approaches based on molecular dynamics (MD) simulations and using simple physical models.

THE USE OF NEWTON'S METHOD FOR LINEAR PROGRAMMING

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Continuous and discrete versions of the barrier-Newton method for linear programming are considered. This primal-dual method is based on the use of Newton's method to find points in the direct and dual spaces which satisfy a consistent system of optimality conditions. The local and non-local properties of the method are investigated. In the discrete versions of the method, the steps used in the direct and dual spaces are different. When the steps are chosen by certain rules, the method converges at superlinear and quadratic rates. In one version of the method the steps are chosen from the condition of steepest descent, and a range of initial conditions for which not more than two iterations are required is identified.

Newton's method is one of the most efficient means of solving systems of non-linear equations and optimization problems. Numerous versions of the method intended for linear programming (LP) have appeared recently. Primal-dual algorithms for which Newton's method is used to solve a parametrized system of equations, the limiting form of which gives optimality conditions for the direct and dual problems, are of special interest. These methods have both quite a high local rate of convergence and polynomial algorithms. We described another primal-dual method, based on solving a system of equations which set the optimality conditions in an LP problem, namely complementary slackness and accessibility.

If a transformation of spaces is used to avoid having to stipulate that the variables are nonnegative and Newton's method is used to find points satisfying the Kuhn-Tucker conditions, a whole family of different methods is obtained. These have been examined for the general problem of nonlinear programming. The present paper investigates methods of a special class, corresponding to componentwise transformations of spaces which involve the right-hand sides of the systems of ordinary differential equations describing the method, being multiplied by diagonal matrices which act as barriers and do not permit the trajectories to intersect the boundaries of positive orthants either in the original space or in the space of dual complementary variables. Unlike, the main focus here is the choice of steps in the direct and dual spaces which, as in, might be different. Versions of the method with small steps and with steps close to one or chosen by solving auxiliary optimization problems are considered separately.

ENERGY RESOURCES

Доп. – Косяненко Н.Н., ЕМ-41

- Talking about the sources of energy we should know what we call energetic resources.
- The main place in the balance of supply, extraction and using belongs to coal, oil and natural gas.