tional condition $f_1(x+iy)$, $f_2(x-iy)=o(1/y^n)$ is introduced, then $f(z)$ may have on (a, b) only poles and limit points of them of an even order less than n. The set of poles forms a set, of which no component is dense in itself. (Received July 29, 1946.)

Applied Mathematics

312. Hillel Poritsky and D. W. Dudley: *Conjugate action of involute helical gears with inclined axes.*

By an involute helical surface is meant a surface consisting of helices of a proper screw motion about an axis and such that a section by a plane perpendicular to the axis is an involute of a proper "base" circle. It is shown that two involute helical surfaces with inclined axes mate correctly in the sense that a uniform rotation of the one surface about its axis A is transformed into a uniform rotation of the other surface about its axis A', provided that certain inequalities in the distance and angle between A, A' are satisfied; the ratio of the two rotational velocities ω/ω' is independent of the distance between the two axes. The point of contact of the mating surfaces always moves along a fixed straight line in space with uniform velocity, this line being normal to each surface. Certain industrial applications are briefly discussed. (Received July 23, 1946.)

313. William Prager: *On the variational principles of plasticity.*

In earlier papers the author outlined a new mathematical theory of plasticity (Prikladnaia Matematika i Mekhanika N.S. vol. 5 (1941) pp. 419–430) and discussed certain variational principles associated with this theory (Duke Math. J. vol. 9 (1942) pp. 228–233). These variational principles were established under the assumption that the velocities or rates of stressing prescribed at the surface produce "loading" throughout the body. In the present paper this restriction is dropped and the general variational principles associated with the new theory of plasticity are established. (Received July 15, 1946.)

314. S. S. Shü: *On Taylor and Maccoll's equation of a cone moving in the air with supersonic speed.*

When an infinite cone is moving in the air with supersonic speed, the shock phenomena occur. Taylor and Maccoll (Proc. Roy. Soc. London, Ser. A. vol. 139 (1933) pp. 278–311) considered a conical flow behind an oblique shock wave and deduced a nonlinear ordinary differential equation which was integrated numerically. The purpose of the present note is first to transpose the equation to the differential-integral form $-\lambda'(\theta)=S_w \exp \int_{\theta}^{\theta_w}((2+\lambda'^2)/\lambda')d\theta/\rho \sin\theta$ (where S_w is a constant, e^{λ} is the ratio of the radial component of the velocity of the flow to the speed of the gas if allowed to be discharged into a vacuum and $\rho^{\gamma-1}=1-e^{2\lambda}(1+\lambda'^2)$) for which the author assumes the position and the intensity of the shock wave known and for which successive approximations are applied. In some cases, the sequence generated by the successive approximations is proved to be monotone and equi-continuous and therefore it converges uniformly to a solution of the problem in the large. A method is suggested for the practical calculation of the angle of the solid cone. The first approximation in which only the rational forms of elementary functions are involved gives a fairly good coincidence with Taylor and Maccoll's calculations. (Received July 20, 1946.)