div $u_1=0$ and div $u_2=0$ are retained. u_0 must have wave character with an exceedingly small wave length λ. Such cases can be handled by means of linear differential equations. (Received November 21, 1942.)

68. Brockway McMillan: *Networks of mechanisms*. Preliminary report.

A mechanism M maps a class I of input histories $i(t)$ upon a class O of output histories $o(t)$, $-\infty<t<\infty$. It is single-valued and has the property that whenever $i_1(t)\equiv i_2(t)$ for $t\leqq t_o$, then $o_1(t)\equiv o_2(t)$ for $t\leqq t_o$. If $o_1(t)\equiv o_2(t)$ for $t\leqq t_o+\lambda$, uniformly in i_1, i_2, and t_o, then M has the latency λ. Suppose that I is closed under an operation of addition, that a null function $i_o(t)\equiv\phi$ is in I, that every $i(t)$ is identically ϕ near $t=-\infty$, and that $O\subseteq I$. Let (M_k) be a collection of mechanisms from I to O such that (a) each has latency at least $\lambda>0$, and (b) each maps the null function on itself. The inputs and outputs of the M_k are interconnected to form a network N. Arbitrary inputs $i(t)\in I$ at each junction make the components of a vector input to N. The vector output of N has for its components the outputs of the various M_k. Theorem: I and O can be extended so that N is a mechanism between its vector inputs and outputs, with latency λ. A motivation is the possibility of application to nerve fiber networks. (Received November 4, 1942.)

69. W. H. Roever: *A new formula for the deviation in range of a projectile due to the earth's rotation.*

On page 68 in his monograph entitled, *The weight field of force of the earth*, published in the Washington University Studies, September, 1940, the author derives for the range of a projectile, a formula [second part of (129)] which by a simple trigonometric transformation can be put in the new form $\bar{x}=(v_0^2/g_1)\sin 2\beta+\Delta\bar{x}$ where $\Delta\bar{x}=-(4v_0^3/3g_1^2)\,\omega\cos\phi_1\sin 3\beta\sin\alpha$, in which ω is the angular velocity of the earth's rotation, g_1 is the acceleration, due to weight, at the position of the gun, ϕ_2 is the astronomical latitude of the position of the gun, α is the azimuth (measured from the south through the west) of the direction of fire, β is the angle of elevation of the gun, v_0 is the muzzle velocity of the projectile, he points out particularly that for fixed values of α and ϕ_1, $\Delta\bar{x}$ changes sign when $\beta=60°$. (Received November 23, 1942.)

Geometry

70. John DeCicco: *Conformal geometry of second order differential equations.*

Kasner in his fundamental paper, *Conformal geometry*, Prcoeedings of the International Congress of Mathematicians, 1912, initiated the conformal study of sets of analytic curves. In previous work, Kasner (with the author) studied the conformal geometry of velocity systems of curves $y''=(1+y'^2)[\phi(x, y)+y'\psi(x, y)]$. This class of velocity systems characterizes the conformal group. Any velocity system possesses six absolute conformal differential covariants of second order. In this paper, it is shown that a system of ∞^2 curves, not of the velocity type, possesses three absolute conformal differential covariants of third order. Moreover any other conformal covariant is a function of these and their partial derivatives. Geometric interpretations of these covariants are also obtained. (Received November 21, 1942.)