fraction $K_1^\infty(1/b_p)$ is that at least one of the following three statements holds: (a) $\sum|b_{2p+1}|$ diverges, (b) $\sum|b_{2p+1}s_p^2|$ diverges, where $s_p=b_2+b_4+\cdots+b_{2p}$, (c) $\lim_{p\to\infty}s_p=\infty$. This condition, which first appeared in a theorem of Hamburger, is called condition (H). In particular, they show that the continued fraction diverges if $\sum b_{2p}$, $\sum b_{2p+1}$ converge, at least one absolutely, thus extending a result of Stern and von Koch. The condition (H) is sufficient for convergence in the case where $b_{2p-1}=k_{2p-1}z_p$, $b_{2p}=k_{2p}$, $k_1>0$, $k_{2p+1}\geqq 0$, $R(k_{2p})\geqq 0$, $R(z_p)\geqq\delta$, $|z_p|<M$ ($\delta>0$, $M>0$, $p=1, 2, \cdots$). This result includes theorems of Stieltjes, Van Vleck, Hamburger and Mall. (Received August 19, 1946.)

375. I. E. Segal: *The group algebra of a locally compact group.*

Earlier results of the author (see Bull. Amer. Math. Soc. Abstract 46-7-366 and Proc. Nat. Acad. Sci. U.S.A. vol. 27 (1940) pp. 348–352) are extended and refined. (Received August 10, 1946.)

376. J. E. Wilkins: *The converse of a theorem of Tchaplygin on differential inequalities.*

If $y(x)$ is a solution of the equation $L[y]\equiv y''-p_1y'-p_2y-q=0$, such that $y(x_0)=y_0$, $y'(x_0)=y_0'$, and if $v(x)$ is such that $L[v]>0$, $v(x_0)=y_0$, $v'(x_0)=y_0'$, then $v(x)>y(x)$ when $x_0<x\leqq x_1$ provided that x_1 is the first zero to the right of x_0 of the solution $u(x)$ of the equations $u''-p_1u'-p_2u=0$, $u(x_0)=0$, $u'(x_0)=1$. This is a best possible result in the sense that either x_1 does not exist or there exists a function $v(x)$ satisfying the above requirements for which $v(x)-y(x)$ vanishes at a point arbitrarily close to x_1. (Received September 27, 1946.)

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377. H. W. Becker: *Circuit algebra.*

By means of the symbols $+$, $\|$, and $\perp$, any passive electrical network is representable on the linotype. They denote series, parallel, and bridge connections respectively, and have inverses $-$, $\_$, and $\top$. The definition $R=a\|b=ab/(a+b)$ generates a system parallel to ordinary arithmetic, except that infinity and zero exchange roles, and so on, hence called paraarithmetic. The number of integer solutions of this equation depends only on the prime factor structure, not magnitude, of R. If $R=p_1^{n_1}\cdots p_m^{n_m}$, this number is $\Psi_m(C+1)$, where $C_0=1$, $C_v=2^{v-1}$, and Ψ is an expansion with generalized binomial coefficients (m, v), the sum of the products of the n's v at a time. Where all the n's equal 1, this reduces to $(3^m+1)/2$. Considered as a static structure, a SP network is collapsible. Rigidity is imparted by bridge connections, or trusses. The elementary model is the Wheatstone bridge $(a_1+a_2)\|(b_1+b_2)\perp\beta=[(a_1+a_2)\cdot(b_1+b_2)\beta+a_1a_2(b_1+b_2)+(a_1+a_2)b_1b_2]/[(a_1+a_2+b_1+b_2)\beta+(a_1+b_1)(a_2+b_2)]$. In this algebra, shorting or opening an operand effects remarkable transformations amongst the operators; as, $(a_1+a_2)\|(b_1+b_2)\perp 0=a_1\|b_1+a_2\|b_2$. In general, $\perp$ connections are specified by subscripts at the pluses involved. Thus the network whose components are the edges of a cubic lattice energized at two opposite vertices is $[(a_1+_1a_2)\|(b_1+_2b_2)+a_3]\|[c_1+(c_2+_1c_3)\|(d_1+_2d_2)]\perp\beta_1\perp\beta_2$. By a method of combinatory synthesis, the total and transfer conductances are then formulated, alternatively to the Kirchhoff method. (Received September 9, 1946.)