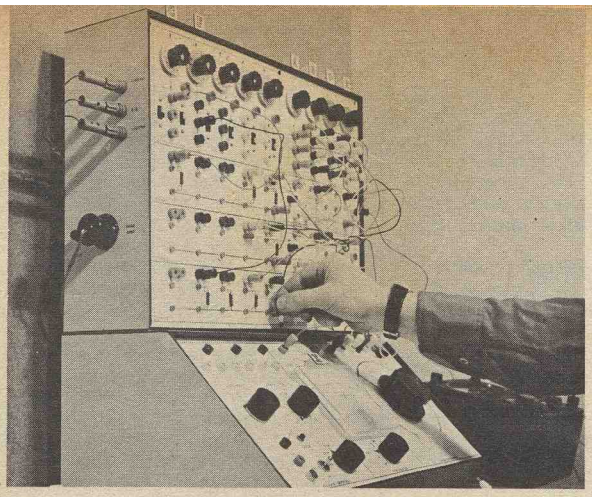

This photograph shows PEAC being used to solve simultaneous equations

After the entire range of input voltages listed in Table 8.1 has been covered, return to $E_{in} = -0{\cdot}2V$ and go through the procedure again, to achieve optimum accuracy. The positive branch can be set up for the same function as the negative branch by transferring patching leads from FG/SK5 to SK1, and FG/SK8 to SK4, but this time trim VR12A for zero-set, and apply positive values of E_{in}. It may be necessary to slightly re-adjust slope controls VR1–VR3 when the two branches are connected in parallel, if there is some small bias voltage imbalance.

THE FUNCTION GENERATOR IN EQUATION SOLVING

The fact that an analogue computer can produce and handle imaginary numbers will be particularly evident when the function generator is applied to equation solving, see Fig. 8.6. One type of function generator circuit configuration will produce consistant outputs for, say, the cube of a number, but not for its square, or vice versa, because $\pm x^2 = +y$, but $+x^3 = +y$, and $-x^3 = -y$. The computer operator must therefore choose, or devise, the appropriate circuit for a given task.

Output y in Fig. 8.6a will be of the required sign when the input is $-x$, but the sign of y with an input of $+x$ cannot be reconciled with mathematical convention. However, the circuit of Fig. 8.6a does provide a consistant output when the function is x^3, with inputs of $\pm x$. Much the same applies to the Fig. 8.6b circuit, which shows the function generator arranged for square root operations. Circuit Fig. 8.6c reverses the above situation and gives consistent outputs for a square function, but not for a cube function, by employing an extra sign reversing amplifier.

Getting away now from the complexities of square roots of negative numbers and other mathematical anomalies, Fig. 8.6d can be made to give outputs of $y = x^2 + x$, or some other combination such as $y = x^{2.5} - 3x$, depending on the choice of function, voltage polarities, and computing resistor values. The purpose of other circuits E–H will be self-evident in Fig. 8.6. Fig. 8.6i gives the symbolised layout for solving a quadratic equation, where x is unknown and a, b, and c are constants. The function generator can also be introduced into problem set-ups where integrating amplifiers are used, as its frequency response is well in excess of any frequency likely to be encountered.

Next month: The final item of the PEAC equipment, UNIT "D", will be described.