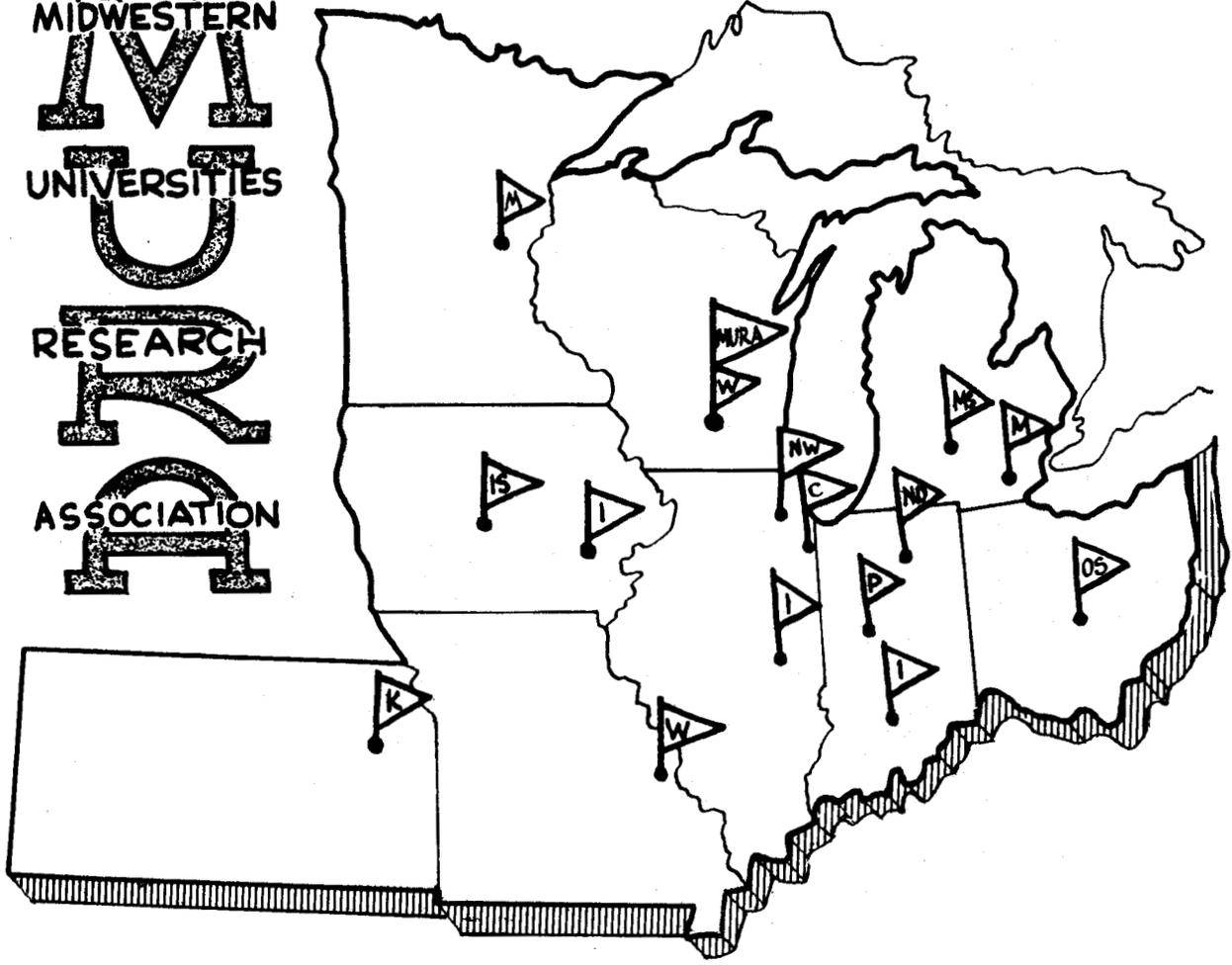


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**REPORT** EQUICYL  
(Program 54)  
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# EQUICYL (Program 54)

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This program was stimulated by the two memoranda F. T. Cole to J. N. Snyder Dec. 18, 1956 and L. J. Laslett to F. T. Cole Dec. 17, 1956.

The program ingests a potential deck from either FOROCYL or FORMERGE and finds a set of coordinate triples  $x$ ,  $\frac{N\phi}{2\pi}$ ,  $y$  lying on the surface

$$\phi + \phi_{ij} = \phi_f = (1+x)^{-k'} \Psi_f$$

The triples will also lie on the surface

$$d \left[ \frac{1}{2\pi w} \log(1+x) \right] + e \left[ \frac{N\phi}{2\pi} \right] = f$$

In a given run  $a$  (= mesh width) such points will be found, one for each value of  $\xi$ ;

$$\left[ \frac{1}{2\pi w} \log(1+x) \right] + \left[ \frac{N\phi}{2\pi} \right] = \xi$$

$$\xi = 0, 1/a, 2/a, \dots, \frac{a-1}{a}$$

$$h = 1/a = \text{horizontal mesh size}$$

The quantities  $1/w$ ,  $N$ ,  $k'$  are taken from the potential deck concerned; the user must specify  $d$ ,  $e$ ,  $f$ ,  $\Psi_f$  for each run desired. All quantities are held from run to run in a series. Only those quantities which change need be specified on each subsequent sheet of the series; the sheets for which should be thoroughly stapled together. Currents are taken into account by specifying  $\phi_{ij}(\xi, \eta)$  at the points where current exists where

$$0 \leq i \leq a - 1, \quad i \leq 326$$

$$1 \leq j \leq b - 1, \quad j \leq 99$$

where  $b$  is the height of the mesh. The location of  $\phi_{ij}$  is specified by giving  $100i + j$ . The restriction

$$a(b - 1) + 2N_c \leq 7600$$

$N_c$  = Number of points at which current exists

is the same as that imposed on FOROCYL. The following restrictions must be observed.

$$-1 < \frac{f}{d+e} < 1$$

$$-1 < \frac{f-d}{d+e} < 1$$

$$-1 < \frac{e+f}{d+e} < 1$$

$$-1 < d < 1$$

$$-1 < e < 1$$

$$-1 < f < 1$$

$$|.1\Psi_f| < .2$$

$$|\mathcal{O}| < 1/2$$

$$|\mathcal{O}_{ij}| < 1/2$$

$$\frac{1}{2\pi w} < 2^{10}$$

$$k' < 2^9$$

$$\frac{N}{2\pi} < 2^{10}$$

$$\frac{1}{2\pi} \sqrt{(1/w^2 + N^2)} < 2^{10}$$

$$\left| \frac{1}{2\pi w} \log(1+x) \right| < 1$$

$$|\log(1+x)| < 1$$

$$|k' \log(1+x)| < 1$$

$$\left| \frac{1+x}{2} \right| < 1$$

Failure to observe these restrictions will stop the machine.

No separate run number is given to an EQUICYL run, it is identified by the d, e, f,  $.1\Psi_f$  given. A series of runs is identified by the FOROCYL or FORMERGE mesh number. Since this number may contain a different HUMAN ID (A) than that of the present user, provision is made for inserting another HUMAN ID to identify each EQUICYL run. This HUMAN ID number printed as a fraction will be subject to the usual inaccuracy of up to  $3 \times 10^{-11}$ .

Print Format:

Appearing once at the beginning of a series:

54	54	54	54	54	54
0	Program #	ID #	← (Pertaining to Mesh used)		
0	a	b			
0	L	M	F		
0	$1/w \cdot 10^{-4}$	$h \cdot 10^{-4}$	$N \cdot 10^{-4}$		
0	$\epsilon_L$	$\epsilon_M$	$\epsilon_F$	r	
0	h	l			
0	$2N_c$				

For each run:

54	Human ID				
54	d	e	f		
54	.1d <sub>f</sub>				
0	x <sub>0</sub>	$(\frac{N0}{2\pi})_0$	y <sub>0</sub> <sup>(1)</sup>	y <sub>0</sub> <sup>(2)</sup>	y <sub>0</sub> <sup>(3)</sup>
1	x <sub>1</sub>	$(\frac{N0}{2\pi})_1$	y <sub>1</sub> <sup>(1)</sup>	y <sub>1</sub> <sup>(2)</sup>	y <sub>1</sub> <sup>(3)</sup>
2	x <sub>2</sub>	$(\frac{N0}{2\pi})_2$	y <sub>2</sub> <sup>(1)</sup>	y <sub>2</sub> <sup>(2)</sup>	y <sub>2</sub> <sup>(3)</sup>
.	.	.	.	.	.
.	.	.	.	.	.
a-1	x <sub>a-1</sub>	$(\frac{N0}{2\pi})_{a-1}$	y <sub>a-1</sub> <sup>(1)</sup>	y <sub>a-1</sub> <sup>(2)</sup>	y <sub>a-1</sub> <sup>(3)</sup>

Note that three roots  $y^{(k)}$  ( $k = 1, 2, 3$ ) can be accommodated on one line for a given  $x$ ,  $(\frac{N0}{2\pi})$ . If less than 3 roots occur, the superfluous spaces will be filled with zeroes. If more than three but no more than eight roots occur, an extra line of 5 numbers will be printed immediately below the line in question. This line will be identified by the characteristic index 12345, and will contain the extra roots with superfluous spaces containing zeroes. If more than eight roots occur, those in excess of eight will be lost.

