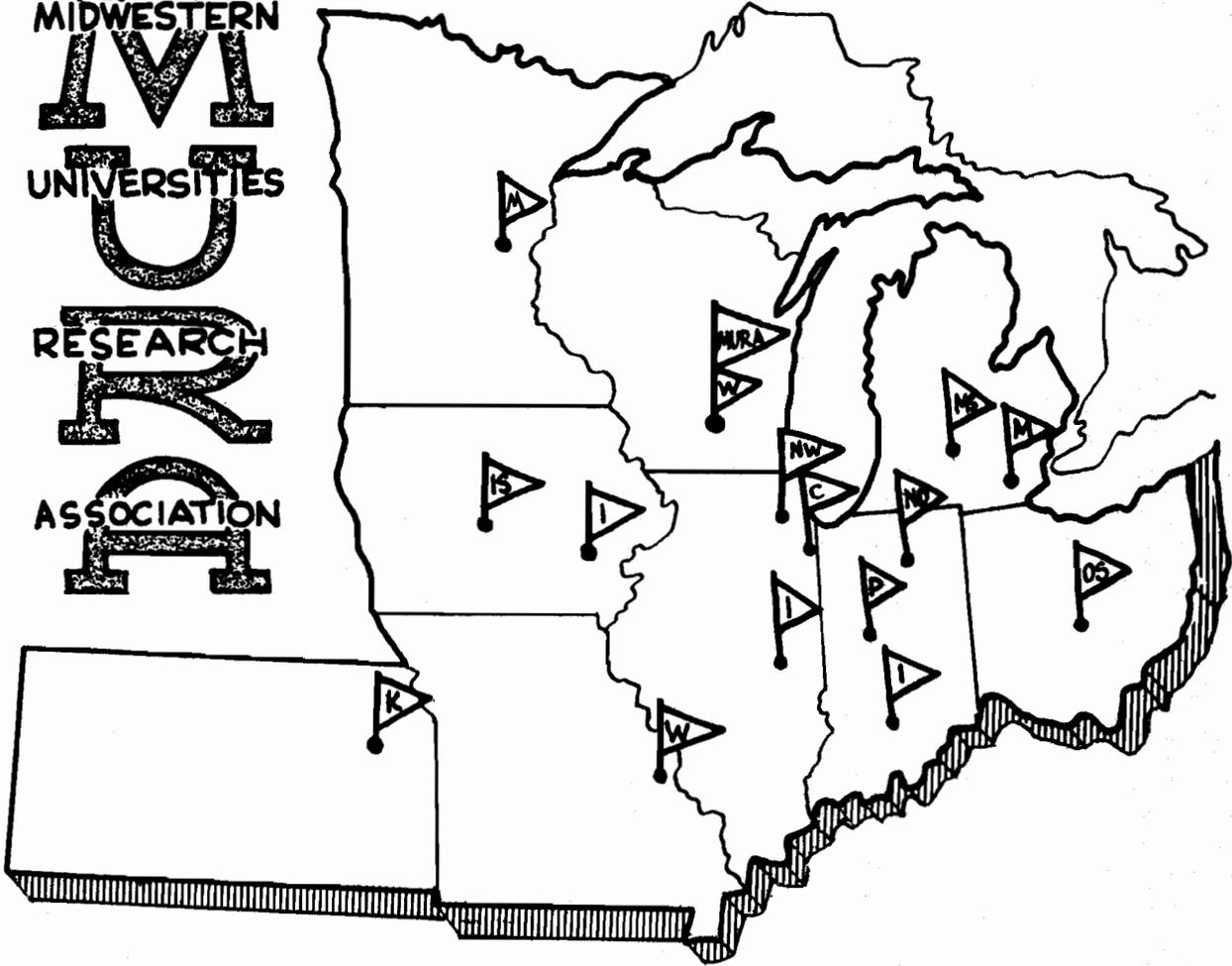




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REPORT FORMESH (INVARIANTS) SCOPE
(PROGRAMME 113)
FORMESH (INVARIANTS) FUMBLEBUMPS
SCOPE (PROGRAMME 114)
FORMESH (INVARIANTS) GRUMBLEBUMPS
SCOPE (PROGRAMME 115)

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FORMESH (INVARIANTS) SCOPE - Programme 113
FORMESH (INVARIANTS) FUMBLEBUMPS SCOPE - Programme 114
FORMESH (INVARIANTS) GRUMBLEBUMPS SCOPE - Programme 115

J. N. Snyder

Each of these programmes augments the respective programme with several cathode ray display features to be described below. The invariant form of the programmes was chosen so as to minimize the number of old programmes that had to be modified and so as to obtain programmes which have all the standard facilities. If invariants are not desired they may be suppressed by raising Sense Switch 3. A space is provided on the agendum sheet for specifying whether or not invariants are to be computed and printed.

Eight display modes are provided. These will be carried out concurrently with and independently of printing which is still controlled by N_p (see previously distributed programme descriptions). It should be noted that if printing is not desired on a given run, it may very simply be suppressed by choosing

$$N_p > N_e$$

On the printed copy the above Programme Numbers will appear in all places where Programme Numbers normally appear. The choice of display mode is made by a parameter SW entered on the Agendum Sheet.

If:

- SW = 0 No scope output will occur.
- = 1 p_x will be plotted against x.
- = 2 p_y will be plotted against y.
- = 3 Both p_x will be plotted against x and p_y will be plotted against y.
- = 4 y will be plotted against x.

- = -1 x will be plotted against t (time).
- = -2 y will be plotted against t.
- * -3 Both x and y will be plotted against t.

In cases SW = 1, 2, 3, 4 the entire run will be placed on one film frame which will be provided with vertical and horizontal axes intersecting in the center of the frame. The frame will be labelled in the upper right hand corner with the Programme Number (113, 114, or 115). To the left of this the Run ID Number will be placed. In cases SW = -1, -2, -3 a given run may occupy several frames of film. The first frame will contain just the Programme Number (113, 114, or 115) below which will be the Run ID Number. Successive frames will have a serial number in the upper right hand corner (1, 2, 3, ...) and will have vertical axes at the extreme left edges of the frame and horizontal axes through the centers of the frames. t is continuous from one frame to the next.

Any mode involving x will be plotted with bright spots; any mode involving only y will be plotted in dim spots. (It should be noted that our devise provides two spot intensities). Whenever x, y, p_x or p_y are used, the maximum departures (in absolute value) from the origin are regarded to be x_{SF} , y_{SF} , p_{xSF} , and p_{ySF} respectively. x_{SF} , y_{SF} , $2^{-6} p_{xSF}$ and $2^{-6} p_{ySF}$ are to be entered on the Agendum Sheet. Samples of these are attached.

It should be noted that the phase plots (SW = 1, 2, 3) are not made with points but rather with small numerals which are advanced by unity for each point plotted. The initial values are always plotted as small zero. This facility will aid in σ -studies. It is suggested that such runs not be prolonged since the diagram could get quite cluttered. The plotted point is in the center of the last digit of the numeral. If it is ever desired to run and plot a phase curve for a long time in order to fill in its shape, an overwrite which suppresses the numeral and plots only a point (bright or dim for x or y) is provided. Mark the Agendum Sheet clearly, distinctly, and

obviously "Use Integer Suppress Overwrite."

N_{YVSX} , N_{PXVSX} , N_{PYVSY} , N_{XVST} , and N_{YVST} are respectively the number of integration steps between successive displays in the respective modes. All modes of display start such a cycle at the beginning of a given run. It is impossible to alter the initial phase of the scope cycle. It is also impossible to change the method of display in the middle of a given run. A given run can of course be repeated using a different mode.

N_T is the number of t - points which embrace the width of a frame in modes $SW = -1, -2, -3$. A value of 256 is quite reasonable.

In the $SW = 3$ mode, no interference between the p_x versus x and p_y versus y exists. The two plots can be made at different intervals (N_{PXVSX} and N_{PYVSY}) and to different scales. In the $SW = -3$ mode an interference between the frequencies of plotting does exist. The advance of the spots in the t direction is controlled by N_{YVST} . If $N_{XVST} < N_{YVST}$, several x points will be plotted at the same abscissa as one y point. If $N_{XVST} > N_{YVST}$, not every y point will be accompanied by an x point.

All scope data is held from run-to-run in a series. Only if the mode is changed need new scope data be provided and then only that which changes. Any piece of data not needed in a given mode of presentation, need not of course be read in.

An Agendum Sheet is provided for each of these programmes; samples of each are attached. These sheets should be used in a series of runs in the following order.

Bump Sheet (Fumble or Grumble or none if Programme 113)

Invariants Sheet (if invariants desired)

Scope Sheet

Formesh Sheet

Formesh Series Sheet (or more Formesh Sheets)

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Scope Sheet

Formesh Sheet (and/or Series Sheet)

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etc., using the rule that when anything is to be changed the appropriate sheet to change it must be inserted.

With respect to the printing of the Human ID Number, the Formesh family belongs to Category II. (Recall the Second Memorandum of 9 January 1957). This Human ID Number is not displayed on the scope. Only the Run ID Number is displayed. Recall that this number may be any integer up to $2^{35} - 1$ but that it will be printed modulo 2^{15} . Hence the user has two choices: either assume these programs belong to Category I for scope purposes, the full 35 bit number can be displayed on the scope but it will be printed modulo 2^{15} ; or assume this program belongs to Category III and limit the number to 15 bits, the printed number and the displayed number will then agree.

It should be further noted that the scope programs are provided at the expense of mesh points. The user must conform to the restrictions:

Formesh (Invariants) Scope - Programme 113

$$3 \text{ ab} \leq 6950$$

Formesh (Invariants) Fumblebumps Scope - Programme 114

$$3 \text{ ab} \leq 6720$$

Formesh (Invariants) Grumblebumps Scope - Programme 115

$$3 \text{ ab} \leq 6616$$

If the user does not conform to these restrictions the programmes will overwrite the pertinent locations and work properly mechanically, but the user should execute the b_{PHONY} procedure in order to inform the programme these values no longer exist.

The parameters FF1 and FF2 control the film frame advances. If the above descriptions are to be followed, omit them. If it is desired to place several graphs of type SW = 1, 2, 3, 4 on a single frame, enter

FF1 = ~~8300 600 000~~ 8 338 276 352
FF2 unaltered

on the second run of the series. (We still want a clear frame on the first run).

To get all graphs of type SW = -1, -2, -3 on a single frame, enter

FF1 unaltered
FF2 = ~~8300 600 000~~ 8 338 276 352

on the agendum for each run for which this is desired. For runs on which normal behavior is desired enter

FF1 = 8321 499 160
or FF2 = 8321 499 160

which restores the normal film frame advance mechanism. Needless to say, these parameters are held from run-to-run until altered. Naturally, the suppression of film frame advances will superpose the FRAME ID NUMBERS and render them either hard to read or impossible to read.

**FORMESH (INVARIANTS) SCOPE AGENDUM SHEET
PROGRAMME 113**

(To be attached by staples after the Invariants Agendum Sheet (if present) but before the Formesh Agendum Sheets of a Series). Note that in this case the limitation

$$3 \text{ ab} \leq 6950$$

must be observed.

Check one.

DO NOT DO INVARIANTS (SS3 UP)	
DO INVARIANTS (SS3 DOWN)	

Integers

Parameter	Address	Value
SW	7143	
N_{YVSX}	7148	
N_{PXVSX}	7149	
N_{PYVSY}	7150	
N_{XVST}	7151	
N_{YVST}	7152	
N_T	7153	
FF1	7258	
FF2	7022	

Fractions

x_{SF}	7144	
y_{SF}	7145	
$2^{-6} p_{xSF}$	7146	
$2^{-6} p_{ySF}$	7147	

**FORMESH (INVARIANTS) FUMBLEBUMPS SCOPE AGENDUM SHEET
PROGRAMME 114**

(To be attached by staples after the Invariants Agendum Sheet (if present) which is after the Fumblebumps Agendum Sheet but before the Formesh Agendum Sheets of a Series). Note that in this case the limitation

$$3 \text{ ab} \leq 6720$$

must be observed.

Check one.

DO NOT DO INVARIANTS (SS3 UP)	
DO INVARIANTS (SS3 DOWN)	

Integers

Parameter	Address	Value
SW	6913	
N _{YV SX}	6918	
N _{PXV SX}	6919	
N _{PYV SY}	6920	
N _{XV ST}	6921	
N _{YV ST}	6922	
N _T	6923	
FF1	7028	
FF2	6792	

Fractions

x_{SF}	6914	
y_{SF}	6915	
$2^{-6} p_{xSF}$	6916	
$2^{-6} p_{ySF}$	6917	

**FORMESH (INVARIANTS) GRUMBLEBUMPS SCOPE AGENDUM SHEET
PROGRAMME 115**

(To be attached by staples after the Invariants Agendum Sheet (if present) which is after the Grumblebumps Agendum Sheet but before the Formesh Agendum Sheets of a Series). Note that in this case the limitation

$$3 \text{ ab} \leq 6616$$

must be observed.

Check one.

DO NOT DO INVARIANTS (SS3 UP)	
DO INVARIANTS (SS3 DOWN)	

Integers

Parameter	Address	Value
SW	6809	
N _Y V _{SX}	6814	
N _{PX} V _{SX}	6815	
N _{PY} V _{SY}	6816	
N _{XV} ST	6817	
N _{YV} ST	6818	
N _T	6819	
FF1	6924	
FF2	6688	

Fractions

x_{SF}	6810	
y_{SF}	6811	
$2^{-6} p_{xSF}$	6812	
$2^{-6} p_{ySF}$	6813	