Sat Aug 25, 1956 T. M.

Tho th. report makes th. operation of th. Math T.M. rather clear, it does not explain just how Math T.M. is related to th. A. I. problem.

It would help to include an introduction, explaining that

1) Math T.M. seems to incorporate into it, all important problems arising in other machine tasks that would seem to require machine intelligence. Some examples. a) Evolutionary T.M. - th. idea of "closeness"

b) Geometry - formation of new heuristics from old (not too good example)

c) simple time series prediction.

d) Chess - Th. search process for better methods of situation evaluation.

2) Math T.M. can, with no signif. alteration, be made to learn arith, solve alg equs. numerically or literally, integrate, solve diff. equs., prove theorems, write new music or extrapolate parts of old music, Paint abstract or concrete pictures, (T.M. could paint directly on color-film negative, with 3 c.R.T. spots), translate from one language into another, play good chess or checkers, etc.

SN Draw up plan of a Math T.M. that uses ngusr, ntpstks, etc., and allows a set to be a component of an ntp. work out defs. of U's, and order in which they are calculated, with not much work on methods of getting new abss. from old.

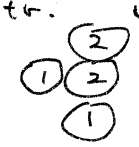
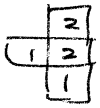
T.M.

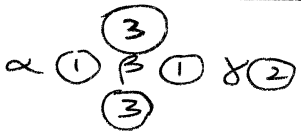
Vocabulary: p·cases : let this be what was formerly called "cases"

cases : what was formerly called "count"

For exposition, define p.case no., case no.

.06 A "new" view of strs and ngms:

A str. may be written  instead of  .

A mixed str and ngm. may be written  .

Using this notation, pngms, strs, and ngms are all special cases of ngms, and th. rules for manipulating them are often th. same:

$$(① + ① = 2①) \times (x_1) = x + x = 2x$$

An advantage of this notation is that it mixes th. problem (assoc. with ngms) with a method of working problems (strs). This is good, because we want T.M. to look upon its self-improvement as "just another problem".

An imp. problem in th. 2 dimensional "str" notation, is substitutions. This causes trouble, when th. object to be substituted may be of various sizes. Some work was done on this problem: X945.26 ff, X955.26ff. X950.21 ← in particular. .40 α142.01

Tues Aug ≈ 21, 1956 To Mo

Rollo suggests that R.M.S. goodness of fit criterion is not too good for getting U_{s_i} and U_{N_j} by optimizing $U_{ij} = U_{s_i} + U_{N_j}$

Actually, if $U_{ij} \to \ln \frac{c_{ij}}{\tau}$ (as $\tau \to \infty$)

this mean squ. criterion may not be bad. What is done, is that abss are tried in order of their U's. What we want, is that these U's should be in about the right order. Now $\to$ means that if $U^*_{ij} \equiv \to \frac{c_{ij}}{\tau}$ and $U^*_{ij} = U^*_{s_i} \cdot U^*_{N_j}$ then $\ln U^*_{s_i} = U_{s_i}$ and $\ln U^*_{N_j} = U_{N_j}$.

RMS of U_{ij} would then mean that the fractional errors in U_{N_j} and U_{s_i} are minimized. This means that one can compare U_{s_i}'s even when they are small. An RMS criterion on $U^*_{s_i}$ and $U^*_{N_j}$ would mean that the comparisons were o.k. when U's were large, but rather poor when U's were small. It seems to me, that is the ratio of the magnitude of error, to the magnitude of the quantity of interest, that we want to minimize! RMS on U_{s_i} and U_{N_j} does just this.

Fri Oct 20, 1956: $U_{ij} \to \ln \frac{c_{ij}}{\tau}$ for $\tau \to \infty$ is fine, but just how does one combine the U_{ij} apri with c_{ij} and τ to get U_{ij}?

$U_{ij} = U_{s_i} + U_{N_j}$ is O.K., but from page 22 of the Dart. report, $U_{ij} = \frac{c_{ij} + w_{ij}(U_{s_i} + U_{N_j})}{\tau + w_{ij}}$ is entirely wrong.

Remember that for logs of zero, we have a cut-off, at, say, -20.

T.M.

from ∝86

People at Summer research project.

Solomonoff
Marvin Misky MIT Lincoln
John McCarthy IBM, Dartmouth
Claude Shannon MIT, Bell
Trench More IBM, MIT
Nat Rochester IBM Poughkeepsee
Oliver Selfridge MIT Lincoln
Julian Bigelow IAS
W. Ross Ashby Barnwood house (?)
W.S. McCulloch, MIT, RLE
Abraham Robinson Montreal logic
Tom Etter
John Nash MIT
David Sayre IBM NewYork
Samuals IBM on checkers
Shoulders MIT RLE or Lincoln) componentsman
. . . . . -(with Shoulders)
Alex Bernstein IBM (NewYork) on chess
Herbert Simon: U of Pa (?)
Allen Newell: Rand