New Math Spec Name (interim)	**Candidate Root Name (capitilization TBD)**	**Operation**
MxM	*mxm*	$\mathbf{C} \oplus= \neg\mathbf{A}^{T} \oplus.\otimes \neg\mathbf{B}^{T}$
MxV	*mxv*	$\mathbf{c} \oplus= \neg\mathbf{A}^{T} \oplus.\otimes \neg\mathbf{b}$
VxM	*vxm*	$\mathbf{c} \oplus= \neg\mathbf{a}^{T} \oplus.\otimes \neg\mathbf{B}^{T}$
Extract	*extract*	$\mathbf{C} \oplus= \neg\mathbf{A}^{T}(\mathbf{i},\mathbf{j})$
Assign	*assign*	$\mathbf{C}(\mathbf{i},\mathbf{j}) \oplus= \neg\mathbf{A}^{T}$
EwiseAdd	*ewiseadd*	$\mathbf{C} \oplus= \neg\mathbf{A}^{T} \oplus \neg\mathbf{B}^{T}$
EwiseMult	*ewisemult*	$\mathbf{C} \oplus= \neg\mathbf{A}^{T} \otimes \neg\mathbf{B}^{T}$
Apply	*apply*	$\mathbf{C} \oplus= f(\neg\mathbf{A}^{T})$
Reduce	*reduce*	$\mathbf{c} \oplus= \oplus_i \mathbf{A}(i,:)$
		$\mathbf{c} \oplus= \oplus_j \mathbf{A}(:,j)$
BuildMatrix	*buildmatrix*	$\mathbf{C} \oplus= \mathbf{S}^{NxM}(\mathbf{i},\mathbf{j},\mathbf{v},\oplus)$
ExtractTuples	*extracttuples*	$(\mathbf{i},\mathbf{j},\mathbf{v}) = \mathbf{A}$
Transpose	*transpose*	$\mathbf{C} \oplus= \neg\mathbf{A}^{T}$
Kron (proposal)	*kron*	$\mathbf{C} \oplus= \neg\mathbf{A}^{T} \otimes \neg\mathbf{B}^{T}$
vector inner product	*v'.'v*	$s \oplus= \neg\mathbf{v}'.'\mathbf{w}$
vector outer product	*vxv*	$\mathbf{C} \oplus= \neg\mathbf{v} \otimes \mathbf{w}$
replicate	*roll*	$\mathbf{C} \oplus= (\neg\mathbf{v}\rho k)^{T}$
	ewiseadd	$\mathbf{z} \oplus= \neg\mathbf{v} \oplus \neg\mathbf{w}$
	ewisemult	$\mathbf{z} \oplus= \neg\mathbf{v} \otimes \neg\mathbf{w}$
	apply	$\mathbf{z} \oplus= f(\neg\mathbf{v})$
	reduce	$\mathbf{z} \oplus= \oplus_i (\neg\mathbf{v}(i))$
	buildvector	$\mathbf{z} \oplus= \mathbf{S}^{N}(\mathbf{i},\mathbf{v})$
	extracttuples	$(\mathbf{i},\mathbf{v}) = \mathbf{v}$
Explicit conversion between pure vetors and single row/column matrix	*assign*	$\mathbf{z}=\mathbf{A}^{T}$
	assign	$\mathbf{C}=\mathbf{v}^{T}$

all pure vectors are column vectors. In above, **c** is column vector
transpose of pure vector gives a 1xn matrix
Perhaps we shouls use a different symbol for circle-plus on the rightr of =. (it is a different operator than the circle-plus in black.)
VXM: a column deficient matrix (vector of 1 column) will be replicated column wise.

Outputs ->	**1**	**2**	**3**	**4**	**5**	**6**	**Inputs ->**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
	C							$\oplus$=		$\neg$	**A**	T	$\oplus$	$\otimes$	$\neg$	**B**	T
	c							$\oplus$=		$\neg$	**A**	T	$\oplus$	$\otimes$	$\neg$	**b**	
	c							$\oplus$=		$\neg$	**a**		$\oplus$	$\otimes$	$\neg$	**B**	
	C							$\oplus$=		$\neg$	**A**	T	**i**	**j**			
	C							$\oplus$=		$\neg$	**A**	T	**i**	**j**			
	C							$\oplus$=		$\neg$	**A**	T	$\oplus$		$\neg$	**B**	T
	C							$\oplus$=		$\neg$	**A**	T	$\otimes$		$\neg$	**B**	T
	C							$\oplus$=	f	$\neg$	**A**	T					
	c							$\oplus$=			**A**		$\oplus$				
	c							$\oplus$=			**A**		$\oplus$				
	C							$\oplus$=	**S**		N	M	**i**	**j**	**v**	$\oplus$	
	i	**j**	**v**								**A**						
	C							$\oplus$=		$\neg$	**A**						
	C							$\oplus$=		$\neg$	**A**	T	$\otimes$		$\neg$	**B**	T
	s							$\oplus$=		$\neg$	**v**	$\oplus$	$\otimes$	**w**			
	C							$\oplus$=		$\neg$	**v**	$\otimes$				**w**	
	C							$\oplus$=		$\neg$	**v**	k					
	z							$\oplus$=		$\neg$	**v**	$\oplus$				**w**	
	z							$\oplus$=		$\neg$	**v**	$\otimes$				**w**	
	z							$\oplus$=	f	$\neg$	**v**						
	z							$\oplus$=		$\neg$	**v**	$\oplus$					
	z							$\oplus$=			**N**	i	**v**				
	i	**v**						=			**v**						
	z							=			**A**	T					
	C							=			**v**	T					