

## Useful Commands in SAS/IML

In general, help for procedures in SAS and for the matrix programming language IML is available through the SAS help system. This is very useful for obtaining the full list of available options and features.

This note lists some basic matrix functions. For further information, see the SAS help system.

### 1: To Start IML

IML is called as a procedure in SAS, i.e. by issuing the command

```
PROC IML;  
..statements..  
QUIT;
```

Whole programs can be submitted in SAS by pressing F8. Often it is more convenient in IML, however, to submit only one command at a time. This is done by selecting the line and submitting it by F8. In this way it is easier to keep track of the calculations and to find syntax errors.

### 2: The Print Command

The print command can be helpful in reporting results. The syntax is

```
print    'Text'  x  [format = 10.4];
```

This prints the explanation **Text** followed by the matrix  $x$ . If  $x$  is an expression (e.g.  $z + y$ ) it should be in parenthesis. The **format** statement indicates 4 decimal points.

### 3: Matrix Functions

The table below lists some often used matrix functions in IML

Syntax	Description	Example
{a b, c d}	Creates a $2 \times 2$ matrix $\begin{pmatrix} a & b \\ c & d \end{pmatrix}$	a={1 2 , 5 6};
I(p)	Creates a $p$ dimensional identity matrix.	a=I(5);
J(n,k,q)	Creates a $n \times k$ matrix with a constant value $q$ .	a=J(2,3,0.50);
vecdiag(a)	Extracts the diagonal of a square matrix $a$ as a vector.	
sum(a)	Return the sum of a the elements in a matrix $a$ .	
‘ or t(a)	Transponation.	a=b‘;
+	Sum of two matrices.	a=b+c;
-	Difference between two matrices.	
*	Multiplication of two matrices.	
inv(x)	Returns the matrix inverse, $x^{-1}$ .	
#	Elementwise (not matrix-) multiplication.	
##	Elementwise power.	
/	Elementwise division.	
A[i, j]	Extract element $a_{ij}$ from a matrix $A$ .	
A[, j]	Extracts the $j$ th column.	
A[i, ]	Extracts the $i$ th row.	
	Columnwise concatenation.	a=b  c;
//	Rowwise concatenation.	a=b//c;
ncol(a)	Returns the number of collumns of the matrix $a$ .	
nrow(a)	Returns the number of rows of the matrix $a$ .	
normal(s)	Return a matrix of pseudorandom normal draws. Initialized by the seed $s$ which also determines the dimensions.	