s = float, d = double, c = complex float, z = complex double float

Vector to Scalar

sd —	◊dot	$\vec{y} \cdot \vec{x}$	
–d —	◊sdot	$\vec{y} \cdot \vec{x}$	single precision to double
s– —	◊dsdot	$\alpha + \vec{x} \cdot \vec{y}$	
— cz	◊dotc_sub	$c \leftarrow \bar{\vec{x}} \cdot \vec{y}$	
— cz	◊dotu_sub	$u \leftarrow \vec{x} \cdot \vec{y}$	regardless of strides, lengths of vectors must match

sd (sc)(dz)	◊asum	$\|x\|_1 = \sum \|x_i\|$	real 1-norm	$\sum \|\Re z_i\| + \|\Im z_i\|$	complex
sd (sc)(dz)	◊nrm2	$\|x\|_2 = \sqrt{\sum \|x_i\|^2}$	real 2-norm	$\|z\|_2 = \sqrt{\sum \|z_i\|^2}$	complex

Vector to Vector

sd cz	◊copy	$\vec{y} \leftarrow \vec{x}$	could be used to go from strided to/from unstrided
sd cz	◊swap	$\vec{y} \leftrightarrow \vec{x}$	differences in strides cause crazy results beyond $\text{stride}_{\text{min}}$
sd cz	◊set	$\vec{x} \leftarrow \alpha_0 \vec{I}$	
sd cz	◊scal	$\vec{x} \leftarrow \alpha \vec{x}$	alpha omplex
— (cs)(zd)	◊scal	$\vec{x} \leftarrow \alpha \vec{x}$	alpha real
sd cz	◊axpy	$\vec{y} \leftarrow \alpha \vec{x} + \vec{y}$	alpha array (strides?)
sd cz	◊axpby	$\vec{y} \leftarrow \alpha \vec{x} + \beta \vec{y}$	alpha + beta arrays
sd cz	◊tbmv	$\vec{x} \leftarrow \alpha A \vec{x}$	A triangular band
sd cz	◊tbsv	$\vec{x} \leftarrow \alpha A \vec{x}$	A triangular band

cs = complex float,
zd = complex double float

Vector-Matrices to Vector

sd cz	◊gbmv	$\vec{y} \leftarrow \alpha A \vec{x} + \beta \vec{y}$	band matrix A
sd cz	◊gemv	$\vec{y} \leftarrow \alpha A \vec{x} + \beta \vec{y}$	any matrix A
— cz	◊hbmv	$\vec{y} \leftarrow \alpha A \vec{x} + \beta \vec{y}$	Hermitian band matrix A
— cz	◊hemv	$\vec{y} \leftarrow \alpha A \vec{x} + \beta \vec{y}$	Hermitian matrix A
— cz	◊hpmv	$\vec{y} \leftarrow \alpha A \vec{x} + \beta \vec{y}$	Hermitian matrix A (packed)
sd —	◊sbmv	$\vec{y} \leftarrow \alpha A \vec{x} + \beta \vec{y}$	symmetric band matrix A
sd —	◊spmv	$\vec{y} \leftarrow \alpha A \vec{x} + \beta \vec{y}$	symmetric matrix A (packed)

sd –	◊symv	$\vec{y} \leftarrow \alpha A\vec{x} + \beta\vec{y}$	symmetric matrix A
sd cz	◊tpmv	$\vec{x} \leftarrow A\vec{x}$	triangular matrix A (packed)
sd cz	◊trmv	$\vec{x} \leftarrow A\vec{x}$	triangular matrix A

Matrix &/or Vectors to Matrix

sd cz	◊gemm	$C \leftarrow \alpha AB + \beta C$	
– cz	◊hemm	$C \leftarrow \alpha AB + \beta C$	Hermitian matrices
sd cz	◊symm	$C \leftarrow \alpha AB + \beta C$	A symmetric
sd cz	◊trmm	$B \leftarrow \alpha AB$	A triangular
sd –	◊ger	$A \leftarrow \alpha\vec{x}\vec{y}^T + A$	rank-1 update
– cz	◊gerc	$A \leftarrow \alpha\vec{x}\bar{\vec{y}} + A$	"
– cz	◊geru	$A \leftarrow \alpha\vec{x}\vec{y}^T + A$	"
– cz	◊hpr	$A \leftarrow \alpha xx^\dagger + A$	" A is packed
– cz	◊hpr2	$A \leftarrow \alpha\vec{x}\vec{y}^\dagger + \alpha^\dagger\vec{y}\vec{x}^\dagger + A$	" A is packed
sd –	◊spr	$A \leftarrow \alpha\vec{x}\vec{x}^T + A$	rank-1 update, A symmetric (packed)
sd –	◊spr2	$A \leftarrow \alpha\vec{x}\vec{y}^T + \alpha\vec{y}\vec{x}^T + A$	rank-2, A symmetric (packed)
sd –	◊syr	$A \leftarrow \alpha\vec{x}\vec{x}^T + A$	rank-1 update, A symmetric
sd –	◊syr2	$A \leftarrow \alpha\vec{x}\vec{y}^T + \alpha\vec{y}\vec{x}^T + A$	rank-2, A symmetric
sd cz	◊syrk	$C \leftarrow \alpha AA^T + \beta C$	rank-k, A symmetric
sd cz	◊syr2k	$C \leftarrow \alpha AB^T + \alpha BA^T + \beta C$	rank-2k, A symmetric
– cz	◊her	$A \leftarrow \alpha\vec{x}\vec{x}^\dagger + \beta A$	rank-1 update, Hermitian
– cz	◊her2	$A \leftarrow \alpha\vec{x}\vec{y}^\dagger + \alpha^\dagger\vec{y}\vec{x}^\dagger + A$	rank-2 update, Hermitian
– cz	◊herk	$C \leftarrow \alpha AA^\dagger + \beta C$	rank-k update, Hermitian
– cz	◊her2k	$C \leftarrow \alpha AB^\dagger + \alpha BA^\dagger + \beta C$	rank-2k update, Hermitian

Equation Solvers

sd cz	◊tpsv	$\vec{x} \leftarrow \vec{x'} : A\vec{x'} = \vec{x}$	x' being solved for, A triangular (packed)
sd cz	◊trsv	$\vec{x} \leftarrow \vec{x'} : A\vec{x'} = \vec{x}$	x' being solved for, A triangular
sd cz	◊trsm	$B \leftarrow X : AX = \alpha B$	X being solved for, A triangular

Givens Rotation Operations

sd (cs)(zd)	◊rot	$\begin{bmatrix} x \\ y \end{bmatrix} \leftarrow \begin{bmatrix} c & s \\ -s & c \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix}$	cos and sin as input
sd —	◊rotm	$\begin{bmatrix} x \\ y \end{bmatrix} \leftarrow P \begin{bmatrix} x \\ y \end{bmatrix}$	modified Givens, from 5-element vector
sd cz	◊rotg		creates Givens rotation
sd —	◊rotmg		creates modified Givens rotation