
vecLib Reference Update

[Performance > Vector Engines](#)



2005-06-04



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Introduction to vecLib Reference Update

This document summarizes the symbols that have been added to the vecLib framework. The full reference documentation notes in what version a symbol was introduced, but sometimes it's useful to see only the new symbols for a given release.

If you are not familiar with this framework you should refer to the complete framework reference documentation.

Organization of This Document

Symbols are grouped by class or protocol for Objective-C and by header file for C. For each symbol there is a link to complete documentation, if available, and a brief description, if available.

See Also

See “vDSP Library.”

vecLib.framework

Various sub-framework APIs have been updated with new functionality.

C Symbols

All of the header files with new symbols in `vecLib.framework` are listed alphabetically, with their new symbols described.

cblas.h

A number of new functions are introduced.

Functions

All of the new functions in this header file are listed alphabetically, with links to documentation and abstracts, if available.

ATLU_DestroyThreadMemory	
catlas_caxpby	
catlas_cset	
catlas_daxpby	
catlas_dset	
catlas_saxpby	
catlas_sset	
catlas_zaxpby	
catlas_zset	

clapack.h

A number of new functions are introduced.

Functions

All of the new functions in this header file are listed alphabetically, with links to documentation and abstracts, if available.

cge1sd_	
cge1ss_	
cgesdd_	
cgesvd_	
chbgvd_	
chetd2_	
cladiv_	
clalsd_	
clangb_	
clange_	
clangt_	
clanhb_	
clanhe_	
clanhp_	
clanhs_	
clanht_	
clansb_	
clansp_	
clansy_	
clantb_	
clantp_	
clantr_	
cpqr_	
cstegr_	
d1amc3_	
d1amch_	

dlangb_	
dlange_	
dlangt_	
dlanhs_	
diansb_	
diansp_	
dianst_	
diansy_	
diantb_	
diantp_	
diantr_	
dlap2_	
dlap3_	
dsecnd_	
dzsum1_	
lsame_	
lsamen_	
scsum1_	
second_	
slamc3_	
slamch_	
slangb_	
slange_	
slangt_	
slanhs_	
slansb_	
slansp_	
slanst_	

slansy_	
slantb_	
slantp_	
slantr_	
slapy2_	
slapy3_	
zge1sd_	
zgesdd_	
zgesvd_	
zhbgvd_	
zheta2_	
zladi_	
zlalsd_	
zlangb_	
zlange_	
zlangt_	
zlanhb_	
zlanhe_	
zlanhp_	
zlanhs_	
zlanht_	
zlansb_	
zlansp_	
zlansy_	
zlantb_	
zlantp_	
zlantr_	
zpteqr_	

zstegr_

vDSP.h

Many new functions are introduced to provide new functionality.

Functions

All of the new functions in this header file are listed alphabetically, with links to documentation and abstracts, if available.

vDSP_acor	
vDSP_acorD	Autocorrelation with automatic selection of domain.
vDSP_acorf	
vDSP_acorfd	Frequency-domain autocorrelation.
vDSP_acort	
vDSP_acortD	Time-domain autocorrelation.
vDSP_blkman	
vDSP_blkmanD	
vDSP_blkman_window	Creates a Blackman window.
vDSP_blkman_windowD	Creates a Blackman window.
vDSP_ccor	
vDSP_ccorD	
vDSP_ccorf	
vDSP_ccorfd	
vDSP_ccort	
vDSP_ccortD	
vDSP_deq22	Difference equation, 2 poles, 2 zeros.
vDSP_deq22D	Difference equation, 2 poles, 2 zeros.
vDSP_desamp	Convolution with decimation.
vDSP_desampD	Convolution with decimation.
vDSP_hamm	

vDSP_hammD	
vDSP_hamm_window	Creates a Hamming window.
vDSP_hamm_windowD	Creates a Hamming window.
vDSP_hann	
vDSP_hannD	
vDSP_hann_window	Creates a Hanning window.
vDSP_hann_windowD	Creates a Hanning window.
vDSP_maxmgv	Vector maximum magnitude.
vDSP_maxmgvD	Vector maximum magnitude.
vDSP_maxmgvi	Vector maximum magnitude with index.
vDSP_maxmgviD	Vector maximum magnitude with index.
vDSP_maxv	Vector maximum value.
vDSP_maxvD	Vector maximum value.
vDSP_maxvi	Vector maximum value with index.
vDSP_maxviD	Vector maximum value with index.
vDSP_meamgv	Vector mean magnitude.
vDSP_meamgvD	Vector mean magnitude.
vDSP_meanv	Vector mean value.
vDSP_meanvD	Vector mean value.
vDSP_measqv	Vector mean square value.
vDSP_measqvD	Vector mean square value.
vDSP_minmgv	Vector minimum magnitude.
vDSP_minmgvD	Vector minimum magnitude.
vDSP_minmgvi	Vector minimum magnitude with index.
vDSP_minmgviD	Vector minimum magnitude with index.
vDSP_minv	Vector minimum value.
vDSP_minvD	Vector minimum value.
vDSP_minvi	Vector minimum value with index.

vDSP_minvid	Vector minimum value with index.
vDSP_mmov	The contents of a submatrix are copied to another submatrix.
vDSP_mmovD	The contents of a submatrix are copied to another submatrix.
vDSP_mvessq	Vector mean of signed squares.
vDSP_mvessqD	Vector mean of signed squares.
vDSP_nzcros	Find zero crossings.
vDSP_nzcrosD	Find zero crossings.
vDSP_polar	Rectangular to polar conversion.
vDSP_polarD	Rectangular to polar conversion.
vDSP_rect	Polar to rectangular conversion.
vDSP_rectD	Polar to rectangular conversion.
vDSP_rmsqv	Vector root-mean-square.
vDSP_rmsqvD	Vector root-mean-square.
vDSP_svdv	Divide scalar by vector.
vDSP_svdvD	Divide scalar by vector.
vDSP_sve	Vector sum.
vDSP_sveD	Vector sum.
vDSP_svemg	Vector sum of magnitudes.
vDSP_svemgD	Vector sum of magnitudes.
vDSP_svesq	Vector sum of squares.
vDSP_svesqD	Vector sum of squares.
vDSP_svs	Vector sum of signed squares.
vDSP_svsD	Vector sum of signed squares.
vDSP_vaam	Vector add, add, and multiply.
vDSP_vaamD	Vector add, add, and multiply.
vDSP_vabs	Vector absolute values.
vDSP_vabsD	Vector absolute values.
vDSP_vabsi	Integer vector absolute values.

vDSP_vasbm	Vector add, subtract, and multiply.
vDSP_vasbmD	Vector add, subtract, and multiply.
vDSP_vasm	Vector add and scalar multiply.
vDSP_vasmD	Vector add and scalar multiply.
vDSP_vavlin	Vector linear average.
vDSP_vavlinD	Vector linear average.
vDSP_vclip	Vector clip.
vDSP_vclipD	Vector clip.
vDSP_vclipc	Vector clip and count.
vDSP_vclipcD	Vector clip and count.
vDSP_vclr	Vector clear.
vDSP_vclrD	Vector clear.
vDSP_vcmprs	Vector compress.
vDSP_vcmprsD	Vector compress.
vDSP_vdbcon	Vector convert power or amplitude to decibels.
vDSP_vdbconD	Vector convert power or amplitude to decibels.
vDSP_vdist	Vector distance.
vDSP_vdistD	Vector distance.
vDSP_vdiv	Vector divide.
vDSP_vdivD	Vector divide.
vDSP_vdivi	Vector divide.
vDSP_vdsp	Vector convert double-precision to single-precision.
vDSP_venvlp	Vector envelope.
vDSP_venvlpD	Vector envelope.
vDSP_veqvi	Vector equivalence, 32-bit logical.
vDSP_vfill	Vector fill.
vDSP_vfillD	Vector fill.
vDSP_vfilli	Integer vector fill.

vDSP_vfix16	
vDSP_vfix16D	
vDSP_vfix32	
vDSP_vfix32D	
vDSP_vfix8	
vDSP_vfix8D	
vDSP_vfixr16	
vDSP_vfixr16D	
vDSP_vfixr32	
vDSP_vfixr32D	
vDSP_vfixr8	
vDSP_vfixr8D	
vDSP_vfixru16	
vDSP_vfixru16D	
vDSP_vfixru32	
vDSP_vfixru32D	
vDSP_vfixru8	
vDSP_vfixru8D	
vDSP_vfixu16	
vDSP_vfixu16D	
vDSP_vfixu32	
vDSP_vfixu32D	
vDSP_vfixu8	
vDSP_vfixu8D	
vDSP_vflt16	
vDSP_vflt16D	
vDSP_vflt32	
vDSP_vflt32D	

vDSP_vflt8	
vDSP_vflt8D	
vDSP_vflt16	
vDSP_vflt16D	
vDSP_vflt32	
vDSP_vflt32D	
vDSP_vflt8	
vDSP_vflt8D	
vDSP_vfrac	Vector truncate to fraction.
vDSP_vfracD	Vector truncate to fraction.
vDSP_vgather	Vector gather.
vDSP_vgatherD	Vector gather.
vDSP_vgathera	Vector gather, absolute pointers.
vDSP_vgatheraD	Vector gather, absolute pointers.
vDSP_vgen	Vector tapered ramp.
vDSP_vgenD	Vector tapered ramp.
vDSP_vgenp	Vector generate by extrapolation and interpolation.
vDSP_vgenpD	Vector generate by extrapolation and interpolation.
vDSP_viclip	Vector inverted clip.
vDSP_viclipD	Vector inverted clip.
vDSP_vindex	Vector index.
vDSP_vindexD	Vector index.
vDSP_vintb	Vector linear interpolation between vectors.
vDSP_vintbD	Vector linear interpolation between vectors.
vDSP_vlim	Vector test limit.
vDSP_vlimD	Vector test limit.
vDSP_vlint	Vector linear interpolation between neighboring values.
vDSP_vlintD	Vector linear interpolation between neighboring values.

vDSP_vma	Vector multiply and add.
vDSP_vmaD	Vector multiply and add.
vDSP_vmax	Vector maxima.
vDSP_vmaxD	Vector maxima.
vDSP_vmaxmg	Vector maximum magnitudes.
vDSP_vmaxmgD	Vector maximum magnitudes.
vDSP_vmin	Vector minima.
vDSP_vminD	Vector minima.
vDSP_vminmg	Vector minimum magnitudes.
vDSP_vminmgD	Vector minimum magnitudes.
vDSP_vmma	Vector multiply, multiply, and add.
vDSP_vmmaD	Vector multiply, multiply, and add.
vDSP_vmmsb	Vector multiply, multiply, and subtract.
vDSP_vmmsbD	Vector multiply, multiply, and subtract.
vDSP_vmsa	Vector multiply and scalar add.
vDSP_vmsaD	Vector multiply and scalar add.
vDSP_vmsb	Vector multiply and subtract.
vDSP_vmsbD	Vector multiply and subtract.
vDSP_vnabs	Vector negative absolute value.
vDSP_vnabsD	Vector negative absolute value.
vDSP_vneg	Vector negative value.
vDSP_vnegD	Vector negative value.
vDSP_vpoly	Vector polynomial.
vDSP_vpolyD	Vector polynomial.
vDSP_vpythag	Vector pythagoras.
vDSP_vpythagD	Vector pythagoras.
vDSP_vqint	Vector quadratic interpolation.
vDSP_vqintD	Vector quadratic interpolation.

vDSP_vramp	Build ramped vector.
vDSP_vrampD	Build ramped vector.
vDSP_vrsum	Vector running sum integration.
vDSP_vrsumD	Vector running sum integration.
vDSP_vrvrs	Vector reverse order, in place.
vDSP_vrvrsD	Vector reverse order, in place.
vDSP_vsadd	Vector scalar add.
vDSP_vsaddD	Vector scalar add.
vDSP_vsaddi	Integer vector scalar add.
vDSP_vsbm	Vector subtract and multiply.
vDSP_vsbmD	Vector subtract and multiply.
vDSP_vbsbm	Vector subtract, subtract, and multiply.
vDSP_vbsbmD	Vector subtract, subtract, and multiply.
vDSP_vbsbm	Vector subtract and scalar multiply.
vDSP_vbsbmD	Vector subtract and scalar multiply.
vDSP_vsdiv	Vector scalar divide.
vDSP_vsdivD	Vector scalar divide.
vDSP_vsdivi	Integer vector scalar divide.
vDSP_vsimps	Simpson integration.
vDSP_vsimpsD	Simpson integration.
vDSP_vsma	Vector scalar multiply and vector add.
vDSP_vsmaD	Vector scalar multiply and vector add.
vDSP_vsmsa	Vector scalar multiply and scalar add.
vDSP_vsmsaD	Vector scalar multiply and scalar add.
vDSP_vsmsb	Vector scalar multiply and vector subtract.
vDSP_vsmsbD	Vector scalar multiply and vector subtract.
vDSP_vsort	Vector in-place sort.
vDSP_vsortD	Vector in-place sort.

vDSP_vsorti	Vector integer in-place sort.
vDSP_vsortiD	Vector integer in-place sort.
vDSP_vspdp	Vector convert single-precision to double-precision.
vDSP_vswap	Vector swap.
vDSP_vswapD	Vector swap.
vDSP_vswsum	Vector sliding window sum.
vDSP_vswsumD	Vector sliding window sum.
vDSP_vtabi	Vector interpolation, table lookup.
vDSP_vtabiD	Vector interpolation, table lookup.
vDSP_vthr	Vector threshold.
vDSP_vthrD	Vector threshold.
vDSP_vthres	Vector threshold with zero fill.
vDSP_vthresD	Vector threshold with zero fill.
vDSP_vthrsc	Vector threshold with signed constant.
vDSP_vthrscD	Vector threshold with signed constant.
vDSP_vtmerg	Vector tapered merge of two vectors.
vDSP_vtmergD	Vector tapered merge of two vectors.
vDSP_vtrapz	Vector trapezoidal integration.
vDSP_vtrapzD	Vector trapezoidal integration.
vDSP_wiener	Wiener-Levinson general convolution.
vDSP_wienerD	Wiener-Levinson general convolution.
vDSP_zaspec	Computes an accumulating autospectrum.
vDSP_zaspecD	Computes an accumulating autospectrum.
vDSP_zcoher	Coherence function of two signals.
vDSP_zcoherD	Coherence function of two signals.
vDSP_zcspec	Accumulating cross-spectrum on two complex vectors.
vDSP_zcspecD	Accumulating cross-spectrum on two complex vectors.
vDSP_zrdesamp	Complex/real downsample with anti-aliasing.

vDSP_zrdesampD	Complex/real downsample with anti-aliasing.
vDSP_zrvdiv	Divides complex vector A by real vector B and leaves the result in vector C.
vDSP_zrvdivD	Divides complex vector A by real vector B and leaves the result in vector C.
vDSP_ztrans	Transfer function.
vDSP_ztransD	Transfer function.
vDSP_ztransD	Transfer function.
vDSP_zvabs	Complex vector absolute value.
vDSP_zvabsD	Complex vector absolute value.
vDSP_zvcmul	Complex vector conjugate and multiply.
vDSP_zvcmulD	Complex vector conjugate and multiply.
vDSP_zvconj	Complex vector conjugate.
vDSP_zvconjD	Complex vector conjugate.
vDSP_zvdiv	Complex vector divide.
vDSP_zvdivD	Complex vector divide.
vDSP_zvfill	Complex vector fill.
vDSP_zvfillD	Complex vector fill.
vDSP_zvmags	Complex vector magnitudes squared.
vDSP_zvmagsD	Complex vector magnitudes squared.
vDSP_zvmgsa	Complex vector magnitudes square and add.
vDSP_zvmgsaD	Complex vector magnitudes square and add.
vDSP_zvmov	Complex vector move.
vDSP_zvmovD	Complex vector move.
vDSP_zvneg	Complex vector negate.
vDSP_zvnegD	Complex vector negate.
vDSP_zvphas	Complex vector phase.
vDSP_zvphasD	Complex vector phase.
vDSP_zvsma	Complex vector scalar multiply and add.

vDSP_zvsmad	Complex vector scalar multiply and add.
vDSP_zvzsm1	Complex vector multiply by complex scalar.
vDSP_zvzsm1D	Complex vector multiply by complex scalar.

Data Types and Constants

All of the new data types and constants in this header file are listed alphabetically, with links to documentation and abstracts, if available.

FFTSetupD	
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vForce.h

A number of new functions are introduced.

Functions

All of the new functions in this header file are listed alphabetically, with links to documentation and abstracts, if available.

vvacos	For each double-precision array element, sets y to the arccosine of x.
vvacosf	For each single-precision array element, sets y to the arccosine of x.
vvacosh	For each double-precision array element, sets y to the inverse hyperbolic cosine of x.
vvacoshf	For each single-precision array element, sets y to the inverse hyperbolic cosine of x.
vvasin	For each double-precision array element, sets y to the arcsine of x.
vvasinf	For each single-precision array element, sets y to the arcsine of x.
vvasinh	For each double-precision array element, sets y to the inverse hyperbolic sine of x.
vvasinhf	For each single-precision array element, sets y to the inverse hyperbolic sine of x.
vvatan	For each double-precision array element, sets y to the arctangent of x.
vvatan2	For each double-precision array element, sets z to the arctangent of y/x.
vvatan2f	For each single-precision array element, sets z to the arctangent of y/x.
vvatanf	For each single-precision array element, sets y to the arctangent of x.

vvatanh	For each double-precision array element, sets y to the inverse hyperbolic tangent of x.
vvatanhf	For each single-precision array element, sets y to the inverse hyperbolic tangent of x.
vvceil	For each double-precision array element, sets y to the ceiling of x.
vvceilf	For each single-precision array element, sets y to the ceiling of x.
vvcos	For each double-precision array element, sets y to the cosine of x.
vvcosf	For each single-precision array element, sets y to the cosine of x.
vvcosh	For each double-precision array element, sets y to the hyperbolic cosine of x.
vvcoshf	For each single-precision array element, sets y to the hyperbolic cosine of x.
vvcosisin	For each double-precision array element, sets the real part of C to the sine of x and the imaginary part of C to the cosine of x.
vvcosisinf	For each single-precision array element, sets the real part of C to the sine of x and the imaginary part of C to the cosine of x.
vvdiv	For each double-precision array element, sets z to y/x.
vvdivf	For each single-precision array element, sets z to y/x.
vvexp	For each double-precision array element, sets y to the exponential of x.
vvexpf	For each single-precision array element, sets y to the exponential of x.
vvfloor	For each double-precision array element, sets y to the floor of x.
vvfloorf	For each single-precision array element, sets y to the floor of x.
vvint	For each double-precision array element, sets y to the integer truncation of x.
vvintf	For each single-precision array element, sets y to the integer truncation of x.
vvlog	For each double-precision array element, sets y to the natural logarithm of x.
vvlog10	For each double-precision array element, sets y to the base 10 logarithm of x.
vvlog10f	For each single-precision array element, sets y to the base 10 logarithm of x.
vvlogf	For each single-precision array element, sets y to the natural logarithm of x.
vvrint	For each double-precision array element, sets y to the nearest integer to x.
vvrintf	For each single-precision array element, sets y to the nearest integer to x.
vvpow	For each double-precision array element, sets z to x raised to the power of y.
vvpowf	For each single-precision array element, sets z to x raised to the power of y.

vvrec	For each double-precision array element, sets y to the reciprocal of y.
vvrecf	For each single-precision array element, sets y to the reciprocal of y.
vvrsqrt	For each double-precision array element, sets y to the reciprocal of the square root of x.
vvrsqrtf	For each single-precision array element, sets y to the reciprocal of the square root of x.
vvsin	For each double-precision array element, sets y to the sine of x.
vvsinco	For each double-precision array element, sets z to the sine of x and y to the cosine of x.
vvsincof	For each single-precision array element, sets z to the sine of x and y to the cosine of x.
vvsinf	For each single-precision array element, sets y to the sine of x.
vvsinh	For each double-precision array element, sets y to the hyperbolic sine of x.
vvsinhf	For each single-precision array element, sets y to the hyperbolic sine of x.
vvsqrt	For each double-precision array element, sets y to the square root of x.
vvsqrtf	For each single-precision array element, sets y to the square root of x.
vvtan	For each double-precision array element, sets y to the tangent of x.
vvtanf	For each single-precision array element, sets y to the tangent of x.
vvtanh	For each double-precision array element, sets y to the hyperbolic tangent of x.
vvtanhf	For each single-precision array element, sets y to the hyperbolic tangent of x.

Document Revision History

This table describes the changes to *vecLib Reference Update*.

Date	Notes
2005-06-04	New document that summarizes the symbols added to the vecLib framework in Mac OS X v10.4.

