			Fillited by Ronstantino	3 Anagnostopodios
May 17, 22 3:07		matrix_proclist		Page 1/14
!				!:.:
1 !	File: matrix_mod_common.f90			! : . : . :
module	matrix_mod_common			!:.:.:
interface	NaN			!:.:.:
interface	isNaN			!:.:.:
subroutine	matrix_random_init			!:.:.:
subroutine	matrix_error	(message)		!:.:.:
pure function	matrix_return_nan_complex8	()	result(r)	!:.:.:
pure function	matrix_return_nan_complex8_z	(z)	result(r)	!:.:.:
pure function	matrix_return_nan_real8_d	(z)	result(r)	!:.:.:
pure function	matrix_return_is_nan_complex8_z	(z)	result(itis)	!:.:.:
pure function	matrix_return_is_nan_real8_d	(z)	result(itis)	!:.:.:
! ·				! : . : . :
1!	File: matrix_mod_array.f90 .			! : . : . :
module	matrix_mod_array			!:.:.:
interface	operator(.mm.)			!:.:.:
interface	random_number			!:.:.:
interface	mmmult			!:.:.:
interface	mvmult			!:.:.:
interface	vmmult			!:.:.:
interface	lmatmul			!:.:.:
interface	eigenvalues			!:.:.:
interface	eigenvectors			!:.:.:
interface	determinant			!:.:.:
interface	lndet			!:.:.:
interface	pfaffian			!:.:.:
interface	lnPfaffian			!:.:.:
interface	inverse			!:.:.:
interface	norm			!:.:.:
interface	hermitian			!:.:.:
interface	hermitian_set			!:.:.:
interface	symmetric			!:.:.:
interface	symmetric_set			!:.:.:
interface	antisymmetric			!:.:.:
interface	antisymmetric_set			!:.:.:
interface	diagonal			!:.:.:
interface	diagonalMatrix			!:.:.:
interface	identitymatrix			!:.:.:
interface	cidentitymatrix			!:.:.
interface	didentitymatrix			!:.:.
interface	paulimatrix			!:.:.:
interface	trace			!:.:.:
interface	trace2			!:.:.:
interface	trace2c			!:.:.:
interface	traceless			!:.:.:
interface	traceless_set			!:.:.:
interface	isHermitian			!:.:.:
interface	isSymmetric			!:.:.
interface	isAntiSymmetric			!:.:.:
interface	sort			!:.:.:
interface	print			!:.:.
interface	printna			!:.:.:
	±			

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interface	save	<b>—</b>		!:.:.:
interface	read			!:.:.:
interface	isNaN			!:.:.:
!	array2 matrix functions			! : . : . :
pure function	array2_trace2_connected	(C, mtype)	result(t)	!:.:.:
pure function	array2_trace2_connected_d	(C, mtype)	result(t)	!:.:.:
pure function	array2_trace2	(C, mtype)	result(t)	!:.:.:
pure function	array2_trace2_d	(C, mtype)	result(t)	!:.:.:
pure function	array2_traceless_get	(C)	result(B)	!:.:.:
pure function	array2_traceless_get_d	(C)	result(B)	!:.:.:
pure subroutine	array2_traceless_set	(C)		!:.:.:
pure subroutine	array2_traceless_set_d	(C)		!:.:.:
pure function	array2_trace	(C)	result(t)	!:.:.:
pure function	array2_trace_d	(C)	result(t)	!:.:.:
pure function	array2_diagonal_get	(C)	result (d)	!:.:.:
pure function	array2_diagonal_get_d	(C)	result(d)	!:.:.:
pure function	array2_diagonal_set	(d)	result(C)	!:.:.:
pure function	array2_diagonal_set_d	(d)	result(C)	!:.:.:
pure function	array2_diagonal_set_from_real	(r,n)	result(C)	!:.:.:
pure function	array2_diagonal_set_from_real_d	(r,n)	result (C)	!:.:.:
pure function	array2_diagonal_set_from_complex	(z,n)	result (C)	!:.:.:
pure function	array2_diagonal_set_from_complex_matrix	(C)	result(D)	!:.:.:
pure function	array2_diagonal_set_from_real_matrix_d	(C)	result(D)	!:.:.:
pure function	array2_diagonal_set_identity_complex_matrix	(n)	result(C)	!:.:.:
pure function	array2_diagonal_set_identity_real_matrix	(n)	result(C)	!:.:.:
pure function	array2_is_Hermitian	(C)	result(r)	!:.:.:
pure function	array2_is_Symmetric	(C)	result(r)	!:.:.:
pure function	array2_is_Symmetric_d	(C)	result(r)	!:.:.:
pure function	array2_is_AntiSymmetric	(C)	result(r)	!:.:.:
pure function	array2_is_AntiSymmetric_d	(C)	result(r)	!:.:.:
pure function	array2 PauliMatrix	(n)	result(C)	!:.:.:
	array2 procedures			! : . : . :
pure function	array3_norm	(C)	result(r)	!:.:.:
pure function	array3_norm_d	(C)	result(r)	!:.:.:
pure function	array2_norm	(C)	result(r)	!:.:.:
pure function	array2_norm_d	(C)	result(r)	!:.:.:
pure function	array1_norm	(C)	result(r)	!:.:.:
pure function	array1_norm_d	(C)	result(r)	!:.:.:
pure subroutine	array2_hermitian_set	(C, uplo)	165416 (1)	!:.:.:
pure function	array2_hermitian_get	(C)	result(CH)	!:.:.:
pure subroutine	array2_symmetric_set	(C, uplo)	105010 (011)	!:.:.:
pure function	array2_symmetric_get	(C)	result(CS)	!:.:.:
pure subroutine	array2_symmetric_set_d	(C,uplo)	resure (cs)	!:.:.:
pure function	array2_symmetric_get_d	(C)	result(CS)	!:.:.:
pure subroutine	array2_antisymmetric_set	(C, uplo)	resure (cs)	!:.:.:
pure function	array2_antisymmetric_get	(C)	result(CS)	!:.:.:
pure subroutine	array2_antisymmetric_set_d	(C, uplo)	165416 (65)	!:.:.:
pure function	array2_antisymmetric_get_d	(C)	result(CS)	!:.:.:
subroutine	array2_gauss_set	(C, sigma)	100410 (00)	!:.:.:
subroutine	array2_gauss_set_d	(C, sigma)		!:.:.:
subroutine	array2_random_set	(C) (C)		!:.:.:
subroutine	array2_random_set_d	(C)		!:.:.:
PUDIOUCINE	arrayz_random_sec_a	(0)		• • • • •

Tuesday May 17, 2022

function arrayl_sort_d (C,by) result(D) recursive subroutine arrayl_quicksortZbyModulus (A,first,last) subroutine arrayl_quicksortZbyModulus (A,first,last) (C) recursive subroutine arrayl_quicksortZbyModulus (C) recursive subroutine arrayl_quicksortZbyMealPart (A,first,last) (C) recursive subroutine arrayl_quicksortZbyMealPart (A,first,last) recursive subroutine arrayl_quicksortDbyModulus_d (A,first,last) recursive subroutine arrayl_quicksortDbyModulus_d (A,first,last) recursive subroutine arrayl_quicksortDbyModulus_d (A,first,last) recursive subroutine arrayl_reversequicksortDbyModulus_d (A,first,last) recursive subroutine arrandom_number_array2 (C) subroutine random_number_array2 (C) subroutine random_number_array2 (C) subroutine random_number_array3 (C) subroutine random_number_array3.gaussian (C,sigma) subroutine random_number_array2.gaussian (C,sigma) subroutine random_number_array2.gaussian (C,sigma) subroutine random_number_array2.gaussian (C,sigma) subroutine random_number_array2.gaussian (C,sigma) random_number_array2.gaussian (C,sigma) random_number_array2.gaussian (C,sigma) random_number_array2.gaussian (C,sigma) random_number_array2.gaussian (C,sigma) random_number_array3.gaussian (C	e 3/14  !:.::: !:.:: !:.:: !:.:: !:.:: !:.:: !:.:: !::: !:::: !:: !::: !: !
function arrayl_sort_d recursive subroutine arrayl_quicksortZbyModulus recursive subroutine arrayl_reversequicksortZbyModulus subroutine arrayl_sortZbyModulus recursive subroutine arrayl_sortZbyModulus recursive subroutine arrayl_quicksortZbyRealPart recursive subroutine arrayl_quicksortZbyRealPart recursive subroutine arrayl_quicksortZbyMagPart recursive subroutine arrayl_quicksortZbyImagPart recursive subroutine arrayl_quicksortZbyImagPart recursive subroutine arrayl_quicksortDbyModulus_d recursive subroutine arrayl_reversequicksortDbyModulus_d recursive subroutine arrayl_reversequicksortDbyModulus_d recursive subroutine arrayl_reversequicksortDbyModulus_d recursive subroutine arrayl_reversequicksortDbyWalue_d recursive subroutine arrayl_reversequicksortDbyWalue_d recursive subroutine arrayl_reversequicksortDbyValue_d recursive subroutine arrayl_reversequicksortDbyValue_d recursive subroutine arrayl_reversequicksortDbyValue_d recursive subroutine random_number_interface: recursive subroutine random_number_arrayl_reversequicksortDbyValue_d recursive subroutine random_number_arrayl_gaussian	
recursive subroutine arrayl_quicksortZbyModulus subroutine arrayl_reversequicksortZbyModulus subroutine arrayl_gortZbyModulus subroutine arrayl_quicksortZbyRealPart recursive subroutine arrayl_quicksortZbyRealPart recursive subroutine arrayl_quicksortZbyRealPart recursive subroutine arrayl_quicksortZbyImagPart recursive subroutine arrayl_quicksortZbyImagPart recursive subroutine arrayl_quicksortZbyImagPart recursive subroutine arrayl_quicksortDbyModulus_d recursive subroutine arrayl_quicksortDbyModulus_d recursive subroutine arrayl_quicksortDbyModulus_d recursive subroutine arrayl_quicksortDbyValue_d recursive subroutine arrayl_gaussian recursive subroutine random_number_array2 recursive subroutine random_number_array2 recursive subroutine random_number_array2 recursive subroutine random_number_array3 recursive subroutine random_number_array2 recursive subroutine random_number_array2 recursive subroutine random_number_array2 recursive subroutine random_number_array1 recursive subroutine random_number_array2 recursive subroutine random_number_array2 recursive subroutine random_number_array1 rec	
recursive subroutine arrayl_reversequicksortZbyModulus subroutine arrayl_sortZbyModulus recursive subroutine arrayl_quicksortZbyRealPart recursive subroutine arrayl_quicksortZbyRealPart recursive subroutine arrayl_quicksortZbyImagPart recursive subroutine arrayl_quicksortZbyImagPart recursive subroutine arrayl_quicksortZbyImagPart recursive subroutine arrayl_quicksortDbyModulus_d recursive subroutine arrayl_quicksortDbyModulus_d recursive subroutine arrayl_quicksortDbyModulus_d recursive subroutine arrayl_quicksortDbyValue_d recursive subroutine arrayl_quicksortDbyValue_d recursive subroutine arrayl_quicksortDbyValue_d recursive subroutine arrayl_reversequicksortDbyValue_d recursive subroutine arrayl_muber_complex_scalar subroutine random_number_array3 (C) subroutine random_number_array1 (C) subroutine random_number_array2 (C) subroutine random_number_complex_scalar_gaussian subroutine random_number_real_scalar_gaussian (C, sigma) subroutine random_number_array3_gaussian_d subroutine random_number_array3_gaussian_d subroutine random_number_array2_gaussian subroutine random_number_array2_gaussian subroutine random_number_array1_gaussian c(c, sigma)	
subroutine arrayl_sortZbyModulus recursive subroutine arrayl_quicksortZbyRealPart recursive subroutine arrayl_reversequicksortZbyRealPart recursive subroutine arrayl_reversequicksortZbyRealPart recursive subroutine arrayl_quicksortZbyImagPart recursive subroutine arrayl_reversequicksortZbyImagPart recursive subroutine arrayl_quicksortDbyModulus_d recursive subroutine arrayl_reversequicksortDbyModulus_d recursive subroutine arrayl_reversequicksortDbyModulus_d recursive subroutine arrayl_reversequicksortDbyValue_d recursive subroutine random_number_complex_scalar subroutine random_number_array2 (C) subroutine random_number_array2 subroutine random_number_array2 (C) subroutine random_number_array3 subroutine random_number_real_scalar_gaussian subroutine random_number_array3_gaussian (C, sigma) subroutine random_number_array2_gaussian subroutine random_number_array2_gaussian subroutine random_number_array2_gaussian_d subroutine random_number_array2_gaussian_d subroutine random_number_array1_gaussian_d subroutine random_number_array1_gaussian_d subroutine random_number_array1_gaussian_d subroutine random_number_array1_gaussian_d c(c, sigma)	
recursive subroutine arrayl_quicksortZbyRealPart recursive subroutine arrayl_reversequicksortZbyRealPart recursive subroutine arrayl_quicksortZbyImagPart recursive subroutine arrayl_reversequicksortZbyImagPart recursive subroutine arrayl_reversequicksortZbyImagPart recursive subroutine arrayl_reversequicksortZbyImagPart recursive subroutine arrayl_quicksortDbyModulus_d recursive subroutine arrayl_quicksortDbyModulus_d recursive subroutine arrayl_quicksortDbyWodulus_d recursive subroutine arrayl_quicksortDbyValue_d recursive subroutine random_number_complex_scalar (z) subroutine random_number_array3 (C) subroutine random_number_array2 (C) subroutine random_number_array1 (C) subroutine random_number_array1 subroutine random_number_real_scalar_gaussian subroutine random_number_array3_gaussian subroutine random_number_array3_gaussian (C, sigma) subroutine random_number_array2_gaussian subroutine random_number_array2_gaussian subroutine random_number_array2_gaussian subroutine random_number_array2_gaussian subroutine random_number_array2_gaussian subroutine random_number_array2_gaussian subroutine random_number_array1_gaussian subroutine random	
recursive subroutine arrayl_reversequicksortZbyRealPart (A, first, last) recursive subroutine arrayl_quicksortZbyImagPart (A, first, last) recursive subroutine arrayl_reversequicksortZbyImagPart (A, first, last) recursive subroutine arrayl_reversequicksortDbyModulus_d (A, first, last) recursive subroutine arrayl_quicksortDbyModulus_d (A, first, last) recursive subroutine arrayl_quicksortDbyValue_d (A, first, last) recursive subroutine arrayl_reversequicksortDbyValue_d (A, first, last)	
recursive subroutine arrayl_quicksortZbyImagPart recursive subroutine arrayl_reversequicksortZbyImagPart recursive subroutine arrayl_quicksortDbyModulus_d recursive subroutine arrayl_quicksortDbyModulus_d recursive subroutine arrayl_quicksortDbyModulus_d recursive subroutine arrayl_quicksortDbyValue_d recursive subroutine arrayl_quicksortDbyValue_d recursive subroutine arrayl_reversequicksortDbyValue_d recursive subroutine random_number_complex_scalar subroutine random_number_array3 (C) subroutine random_number_array1 (C) subroutine random_number_array1 (C) subroutine random_number_complex_scalar_gaussian subroutine random_number_array3_gaussian (C, sigma) subroutine random_number_array3_gaussian subroutine random_number_array2_gaussian subroutine random_number_array2_gaussian subroutine random_number_array2_gaussian subroutine random_number_array1_gaussian subroutine ra	
recursive subroutine arrayl_reversequicksortZbyTmagPart recursive subroutine arrayl_quicksortDbyModulus_d recursive subroutine arrayl_reversequicksortDbyModulus_d recursive subroutine arrayl_quicksortDbyValue_d recursive subroutine arrayl_reversequicksortDbyValue_d recursive subroutine random_number_complex_scalar subroutine random_number_array3 (C) subroutine random_number_array1 subroutine random_number_array1 subroutine random_number_complex_scalar_gaussian subroutine random_number_complex_scalar_gaussian subroutine random_number_array3_gaussian subroutine random_number_array3_gaussian subroutine random_number_array3_gaussian_d subroutine random_number_array2_gaussian subroutine random_number_array2_gaussian subroutine random_number_array2_gaussian_d subroutine random_number_array2_gaussian_d subroutine random_number_array1_gaussian subroutine random_number_array1_gaussian subroutine random_number_array1_gaussian_d subroutine random_numb	
recursive subroutine arrayl_quicksortDbyModulus_d recursive subroutine arrayl_reversequicksortDbyModulus_d recursive subroutine arrayl_quicksortDbyValue_d recursive subroutine arrayl_reversequicksortDbyValue_d recursive subroutine arrayl_reversequicksortDbyValue_d recursive subroutine arrayl_reversequicksortDbyValue_d  !	!:.:.: !:.:.: !:.:.: !:.:.: !:.:.:
recursive subroutine arrayl_reversequicksortDbyModulus_d recursive subroutine arrayl_quicksortDbyValue_d recursive subroutine arrayl_quicksortDbyValue_d (A, first, last) (C, sigma) (C) (C) (C) (C) (C) (C) (C) (C) (C) (C	!:.:.: !:.:.: !:.:.: !:.:.: !:.:.:
recursive subroutine arrayl_quicksortDbyValue_d recursive subroutine arrayl_reversequicksortDbyValue_d  (A, first, last)  (C, first, last)  (C)  subroutine random_number_complex_scalar subroutine random_number_array3 subroutine random_number_array2 (C)  subroutine random_number_array1 subroutine random_number_complex_scalar_gaussian subroutine random_number_real_scalar_gaussian subroutine random_number_array3_gaussian subroutine random_number_array3_gaussian subroutine random_number_array3_gaussian subroutine random_number_array2_gaussian subroutine random_number_array2_gaussian subroutine random_number_array2_gaussian subroutine random_number_array2_gaussian subroutine random_number_array2_gaussian subroutine random_number_array1_gaussian	!:.:.: !:.:.: !:.:.: !:.:.:
recursive subroutine arrayl_reversequicksortDbyValue_d (A, first, last)	!:.:.: !:.:.: !:.:.: !:.:.:
!random_number interface:  subroutine random_number_complex_scalar (z)  subroutine random_number_array3 (C)  subroutine random_number_array2 (C)  subroutine random_number_array1 (C)  subroutine random_number_complex_scalar_gaussian (z,sigma)  subroutine random_number_real_scalar_gaussian (r,sigma)  subroutine random_number_array3_gaussian (C,sigma)  subroutine random_number_array3_gaussian (C,sigma)  subroutine random_number_array2_gaussian (C,sigma)  subroutine random_number_array2_gaussian (C,sigma)  subroutine random_number_array2_gaussian (C,sigma)  subroutine random_number_array1_gaussian (C,sigma)	.!:.:.: !:.:.: !:.:.: !:.:.:
subroutinerandom_number_complex_scalar(z)subroutinerandom_number_array3(C)subroutinerandom_number_array2(C)subroutinerandom_number_array1(C)subroutinerandom_number_complex_scalar_gaussian(z, sigma)subroutinerandom_number_real_scalar_gaussian(r, sigma)subroutinerandom_number_array3_gaussian(C, sigma)subroutinerandom_number_array2_gaussian_d(C, sigma)subroutinerandom_number_array2_gaussian_d(C, sigma)subroutinerandom_number_array1_gaussian_d(C, sigma)subroutinerandom_number_array1_gaussian_d(C, sigma)subroutinerandom_number_array1_gaussian_d(C, sigma)subroutinerandom_number_array1_gaussian_d(C, sigma)subroutinerandom_number_array1_gaussian_d(C, sigma)array2matmul operator overload	!:.:.: !:.:.: !:.:.:
subroutinerandom_number_array3(C)subroutinerandom_number_array2(C)subroutinerandom_number_array1(C)subroutinerandom_number_complex_scalar_gaussian(z, sigma)subroutinerandom_number_real_scalar_gaussian(r, sigma)subroutinerandom_number_array3_gaussian_d(C, sigma)subroutinerandom_number_array2_gaussian_d(C, sigma)subroutinerandom_number_array2_gaussian_d(C, sigma)subroutinerandom_number_array1_gaussian_d(C, sigma)subroutinerandom_number_array1_gaussian_d(C, sigma)subroutinerandom_number_array1_gaussian_d(C, sigma)subroutinerandom_number_array1_gaussian_d(C, sigma)!array2 matmul operator overload	!:.:.: !:.:.:
subroutinerandom_number_array2(C)subroutinerandom_number_array1(C)subroutinerandom_number_complex_scalar_gaussian(z, sigma)subroutinerandom_number_real_scalar_gaussian(r, sigma)subroutinerandom_number_array3_gaussian_d(C, sigma)subroutinerandom_number_array2_gaussian_d(C, sigma)subroutinerandom_number_array2_gaussian_d(C, sigma)subroutinerandom_number_array1_gaussian_d(C, sigma)subroutinerandom_number_array1_gaussian_d(C, sigma)subroutinerandom_number_array1_gaussian_d(C, sigma)subroutinerandom_number_array1_gaussian_d(C, sigma)subroutinerandom_number_array1_gaussian_d(C, sigma)!array2 matmul operator overload	!:.:.: !:.:.:
subroutinerandom_number_array1(C)subroutinerandom_number_complex_scalar_gaussian(z,sigma)subroutinerandom_number_real_scalar_gaussian(r,sigma)subroutinerandom_number_array3_gaussian(C,sigma)subroutinerandom_number_array2_gaussian_d(C,sigma)subroutinerandom_number_array2_gaussian_d(C,sigma)subroutinerandom_number_array1_gaussian_d(C,sigma)subroutinerandom_number_array1_gaussian_d(C,sigma)subroutinerandom_number_array1_gaussian_d(C,sigma)!	!:.:.:
subroutinerandom_number_complex_scalar_gaussian(z,sigma)subroutinerandom_number_real_scalar_gaussian(r,sigma)subroutinerandom_number_array3_gaussian(C,sigma)subroutinerandom_number_array2_gaussian_d(C,sigma)subroutinerandom_number_array2_gaussian_d(C,sigma)subroutinerandom_number_array2_gaussian_d(C,sigma)subroutinerandom_number_array1_gaussian(C,sigma)subroutinerandom_number_array1_gaussian_d(C,sigma)!	
subroutinerandom_number_real_scalar_gaussian(r, sigma)subroutinerandom_number_array3_gaussian(C, sigma)subroutinerandom_number_array3_gaussian_d(C, sigma)subroutinerandom_number_array2_gaussian(C, sigma)subroutinerandom_number_array2_gaussian_d(C, sigma)subroutinerandom_number_array1_gaussian(C, sigma)subroutinerandom_number_array1_gaussian_d(C, sigma)!	1
subroutinerandom_number_array3_gaussian(C, sigma)subroutinerandom_number_array3_gaussian_d(C, sigma)subroutinerandom_number_array2_gaussian(C, sigma)subroutinerandom_number_array2_gaussian_d(C, sigma)subroutinerandom_number_array1_gaussian(C, sigma)subroutinerandom_number_array1_gaussian_d(C, sigma)!	!:.:.:
subroutinerandom_number_array3_gaussian_d(C, sigma)subroutinerandom_number_array2_gaussian(C, sigma)subroutinerandom_number_array2_gaussian_d(C, sigma)subroutinerandom_number_array1_gaussian(C, sigma)subroutinerandom_number_array1_gaussian_d(C, sigma)!array2 matmul operator overload(C, sigma)	!:.:.:
subroutine       random_number_array2_gaussian       (C,sigma)         subroutine       random_number_array2_gaussian_d       (C,sigma)         subroutine       random_number_array1_gaussian       (C,sigma)         subroutine       random_number_array1_gaussian_d       (C,sigma)         !array2 matmul operator overload	!:.:.:
subroutine       random_number_array2_gaussian_d       (C,sigma)         subroutine       random_number_array1_gaussian       (C,sigma)         subroutine       random_number_array1_gaussian_d       (C,sigma)         !	!:.:.:
subroutine       random_number_array1_gaussian       (C,sigma)         subroutine       random_number_array1_gaussian_d       (C,sigma)         !       array2 matmul operator overload	!:.:.:
subroutine random_number_array1_gaussian_d (C,sigma)	!:.:.:
! array2 matmul operator overload	!:.:.:
	!:.:.:
	.!:.:.:
pure function array2_matmul_array2 (C1,C2) result(C3)	!:.:.:
pure function array2_matmul_array2_d (C1,C2) result(C3)	!:.:.:
pure function array2_d_matmul_array2 (C1,C2) result(C3)	!:.:.:
pure function array2_d_matmul_array2_d (C1,C2) result(C3)	!:.:.:
pure function array2_matmul_array1 (C1,v2) result(v3)	!:.:.:
pure function array1_matmul_array2 (v1,C2) result(v3)	!:.:.:
pure function array2_d_matmul_array1_d (C1,v2) result(v3)	!:.:.:
pure function array1_d_matmul_array2_d (v1,C2) result(v3)	!:.:.:
pure function array2_matmul_array1_d (C1,v2) result(v3)	!:.:.:
pure function array1_d_matmul_array2 (v1,C2) result(v3)	!:.:.:
pure function array2_d_matmul_array1 (C1,v2) result(v3)	!:.:.:
pure function array1_matmul_array2_d (v1,C2) result(v3)	!:.:.:
	.!:.:.:
subroutine array2_print (C, unit, fmt, form, name, ips, ipe, jps, jpe)	!:.:.:
subroutine array1_print (C, unit, fmt, form, name, ips, ipe)	!:.:.:
subroutine array2_print_d (C, unit, fmt, form, name, ips, ipe, jps, jpe)	!:.:.:
subroutine array1_print_d (C, unit, fmt, form, name, ips, ipe)	!:.:.:
subroutine array2_print_nonallocatable (C, unit, fmt, form, name, ips, ipe, jps, jpe)	!:.:.:
subroutine array2_print_nonallocatable_d (C,unit,fmt,form,name,ips,ipe,jps,jpe)	!:.:.:
subroutine array3_save_matrix (C,unit,fmt)	!:.:.:
subroutine array2_save_matrix (C, unit, fmt)	!:.:.:
subroutine arrayl_save_matrix (C, unit, fmt)	!:.:.:
subroutine array3_save_matrix_d (C, unit, fmt)	!:.:.:
subroutine array2_save_matrix_d (C, unit, fmt)	!:.:.:
subroutine array1_save_matrix_d (C, unit, fmt)	!:.:.:

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subroutine	array3_read_matrix		(C,unit)		!:.:.:
subroutine	array2_read_matrix		(C, unit)		!:.:.:
subroutine	array1_read_matrix		(C, unit)		!:.:.:
subroutine	array3_read_matrix_	_d	(C, unit)		!:.:.:
subroutine	array2_read_matrix_		(C, unit)		!::::
subroutine	array1_read_matrix_		(C, unit)		!::::
pure function	array3_is_nan		(C)	result(itis)	!:.:.:
pure function	array2_is_nan		(C)	result(itis)	!:.:.:
pure function	array1_is_nan		(C)	result(itis)	!:.:.:
pure function	array3_is_nan_d		(C)	result(itis)	!:.:.:
pure function	array2_is_nan_d		(C)	result(itis)	!:.:.:
pure function	array1_is_nan_d		(C)	result(itis)	! : . : . :
1	File: matri	y mod matrix f90			
!					
module	matrix_mod_matrix				!:.:.:
use	matrix_mod_common				! : . : . :
use	matrix_mod_common matrix_mod_array				! : . : . :
1					!:.::
public		· · Matrix DMatr	ix, Vector, DVector		! : . : . :
public		:: mmmult, mvmult			!:.:.:
-		•	•	nanas haumitian naum summatuis	
public				nspose, hermitian, norm, symmetric	! : . : . :
public			dot_product, maxval, minval, trac		! : . : . :
public				se, determinant, eigenvalues, eigenvector	
public			an, lnPfaffian, isHermitian, isSy		!:.:.:
public			, hermitian_set, symmetric_set, a	ntisymmetric_set	!::::
public		:: abs, sin, cos,			!::::
public		:: matrix_random_	_init, NaN, f_mout		!:.:.:
public				tor(*), operator(/) , operator(**)	:.:.! :.:.:!
type	MatrixClass				! : . : . :
integer		:: m=0, n=0			!:.:.:
integer		:: is=0, ie=0, js=0	).ie=0		! : . : . :
character (mtype_1	len)	:: mtype='GG'	-, 5		!:.:.:
character( name_		:: name=''			!:.:.:
generic	2011/	:: save	=> matrix_save		! : . : . :
generic		:: read	=> matrix_read		! : . : . :
generic		:: print	=> matrix_print		! : . : . :
generic		:: random	=> matrix_print => matrix_random_set		! : . : . :
generic		:: gaussian	=> matrix gaussian set		! : . : . :
	s(MatrixClass)	:: Matrix	· Mactin_gaabbian_bec		! : . : . :
complex(dp), allo		:: Matrix :: v(:,:)			! : . : . :
generic	Cacabie		=> matrix hermitian set		! : . : . :
3		<del>-</del>			
generic		:: conjg	<pre>=&gt; matrix_return_conjg =&gt; matrix_return_transpose</pre>		! : . : . :
generic		:: transpose	<u>-</u>		!:.:.:
generic		:: hermitian	=> matrix_return_hermitian		! : . : . :
generic		:: dagger	=> matrix_return_hermitian		! : . : . :
generic		:: re	=> matrix_return_real_dmatrix		! : . : . :
generic	(24 ) 1 (2)	:: im	<pre>=&gt; matrix_return_imag_dmatrix</pre>		!:.:.:
	s(MatrixClass)	:: DMatrix			!:.:.:
real (dp), allo generic	ocatable	:: v(:,:)			!:.:.:
		:: svmmetric set	<pre>=&gt; matrix_symmetric_set_d</pre>		!:.:.:

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generic		:: transpose	=> matrix_return_transpose_d	!:.:.:
generic		:: symmetric	=> matrix_return_transpose_d	!:.:.:
type	Vector	_	_	!:.:.:
integer		:: n =0		!:.:.:
integer		:: is=0,ie=0		!:.:.:
character	( name_len)	:: name=''		!:.:.:
type	DVector			!:.:.:
integer		:: n =0		!:.:.:
integer		:: is=0,ie=0		!:.:.:
character	( name_len)	:: name=''		!:.:.:
interface	assignment(=)			!:.:.:
interface	operator(+)			!:.:.:
interface	operator(-)			!:.:.:
interface	operator(*)			!:.:.:
interface	operator(/)			!:.:.:
interface	operator(**)			!:.:.:
interface	random_number			!:.:.:
interface	mmmult			!:.:.:
interface	mvmult			!:.:.:
interface	vmmult			!:.:.:
interface	conjg			!:.:.:
interface	transpose			!:.:.:
interface	hermitian			!:.:.:
interface	symmetric			!:.:.:
interface	trace			!:.:.:
interface	trace2			!:.:.:
interface	trace2c			!:.:.:
interface	inverse			!:.:.:
interface	eigenvalues			!:.::
interface	eigenvectors			!:.:.:
interface	determinant			!:.:.:
interface	lndet			!:.:.:
interface	Pfaffian			!:.:.:
interface	lnPfaffian			!:.::
interface	diagonal			!:.::
interface	diagonalMatrix			!:.::
interface	sort			!:.::
interface	norm			!:.:.:
interface	real			!:.::
interface	aimag			!:.::
interface	mcmplx			!:.:.:
interface	dot_product			1:.:.:
interface	maxval			1:.:.:
interface	minval			1:.:.:
interface	traceless			!:.::
interface	traceless_set			!:.::
interface	hermitian_set			!:.::
interface	symmetric_set			!:.::
interface	antisymmetric_set			!:.::
interface	isHermitian			!:.:.
interface	isHermitian isSymmetric			
interface	isAntiSymmetric			!:.:.: !:.::
Incertace	Tavuctalumectic			*****

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interface	isNaN	-		!:.:.
interface	metadata_copy			!:.:.
interface	abs			!:.:.
interface	sin			!:.:.
interface	COS			!:.:.
interface	exp			!:.:.
interface	log			!:.:.
interface	sart.			!:.:.
!	- 1			! : . : .
!	File: tensorprod_mod.f90			! : . : .
nodule	tensorprod mod			!
!	tensorprod_mod			!:.:.
public	:: tensorprod, vec2ro	ow, vec2col, vectorize		!:.:.
!	:: tensorprod, vec2rd			!:.:.
interface	tensorprod			! : . : .
pure function	tensorprod_complex_complex	(X, Y)	result(Z)	! : . : .
pure function	tensorprod_complex_3	(X1, X2, X3)	result(Z)	! : . : .
pure function	tensorprod_complex_4	(X1, X2, X3) (X1, X2, X3, X4)	result(Z)	! : . : .
pure function	tensorprod_complex_5	(X1, X2, X3, X4, X5)	result(Z)	! : . : .
pure function	tensorprod_complex_6	(X1, X2, X3, X4, X5) (X1, X2, X3, X4, X5, X6)	result(Z)	! : . : .
pure function	tensorprod_real real	(X, Y)	result(Z)	! : . : .
pure function	tensorprod_real_3	(X, Y) (X1, X2, X3)	result(Z)	!:.:.
pure function	tensorprod_real_4	(X1, X2, X3) (X1, X2, X3, X4)	result(Z)	! : . : .
pure function	tensorprod_real_5	(X1, X2, X3, X4) (X1, X2, X3, X4, X5)	result(Z)	!:::
pure function	tensorprod_real_6	(X1, X2, X3, X4, X3) (X1, X2, X3, X4, X5, X6)	result(Z)	!:.:.
pure function	tensorprod_real_o tensorprod_complex_vec_vec		* *	!:.:.
±		(u, v)	result(Z)	
pure function	tensorprod_real_vec_vec	(u, v)	result(Z)	!:.:.
pure function	vec2col_complex	(u)	result(Z)	!:.:.
pure function	vec2row_complex	(u)	result(Z)	!:.:.
pure function	vec2col_real	(u)	result(Z)	!:.:.
pure function	vec2row_real	(u)	result(Z)	!:.:.
	vectorize_complex	(Z)	result (u)	!:.:.
pure function	vectorize_real	(Z)	result (u)	!:.:.
	File: array_mod.f90			
nodulo	array mod			1
	array_11100			!
public	:: mmmult , mvmult, v			!:.:.
public		nes, eigenvectors, determinant, lndet	nfaffian laDfaffian invonce	! : . : .
public		ian_set, symmetric, symmetric_set, an		!:::
-				
public		LMatrix, trace, trace2, trace2c, trace		!:.:. !:.:.
public		identitymatrix, didentitymatrix, paul	Illiaurix	
public		isSymmetric, isAntisymmetric, sort		!:.:.
public	:: random_number, mat			!:.:.
public		ave, read, isNaN, NaN		!:.:.
public	:: operator(.mm.)			!:.:.
public	:: tensorprod, vec2rd	ow, vec2col, vectorize		.:.! .:.:!
public	:: f_mout, f_minput			!:.:. !:.:.
	<u></u>			
	File: matrix_mod_matrix_matrix.f9			

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	Constructors			!:.::
function	matrix_construct_zero	(m,n,is,js,mtype,name)	result(MAT)	!:.:.:
function	matrix_construct_array2	(C, is, js, mtype, name)	result(MAT)	!:.:.:
function	matrix_construct_complex	(c, m, n, is, js, mtype, name)	result(MAT)	!:.:.:
function	matrix_construct_real	<pre>(r,m,n,is,js,mtype,name)</pre>	result(MAT)	!:.:.:
function	matrix_construct_random	<pre>(rtype,m,n,is,js,mtype,name, sigma)</pre>	result(MAT)	!:.:.:
subroutine	matriv hormitian cot	(c,m,n,1s,js,mtype,name) (r,m,n,is,js,mtype,name) (rtype,m,n,is,js,mtype,name, sigma) (MAT, uplo)		1
!		/3/2 mp 3/2 m2 )		
pure subroutine	matrix_assignFrom_matrix	(MATB, MATA)		!:.:.:
subroutine	matrix_assignFrom_dmatrix	(MATB, MATA)		!:.:.:
subroutine	matrix_assignFrom_real	(MATB, r)		!:.:.:
subroutine	matrix_assignFrom_complex	(MATB, r)		!:.:.:
subroutine	matrix_assignFrom_array2	(MATB, C)	7 - (MA III)	!:.:.:
pure function	real_plus_matrix	(r,MATA)	result (MATB)	!:.:.:
pure function	matrix_plus_real	(MATA, r)	result (MATB)	!:.:.:
pure function	complex_plus_matrix	(r,MATA)	result (MATB)	!:.:.:
pure function	matrix_plus_complex	(MATA, r)	result (MATB)	!:.:.:
function	matrix_plus_array2	(MATA, C)	result (MATB)	!:.:.:
function	array2_plus_matrix	(C, MATA)	result (MATB)	!:.:.:
function	matrix_plus_matrix	(MATA, MATB)	result (MATC)	!:.:.:
function	matrix_plus_dmatrix	(MATA, MATB)	result (MATC)	!:.:.:
function	dmatrix_plus_matrix	(MATA, MATB)	result (MATC)	!:.:.:
pure function	real_subtract_matrix	(r,MATA)	result (MATB)	!:.:.:
pure function	matrix_subtract_real	(MATA,r)	result (MATB)	!:.:.:
pure function	complex_subtract_matrix	(r,MATA)	result (MATB)	!:.:.:
pure function	matrix_subtract_complex	(MATA,r)	result (MATB)	!:.:.:
function	matrix_subtract_array2	(MATA, C)	result (MATB)	!:.:.:
function	array2_subtract_matrix	(C, MATA)	result (MATB)	!:.:.:
function	matrix_subtract_matrix	(MATA, MATB)	result (MATC)	!:.:.:
function	matrix_subtract_dmatrix	(MATA, MATB)	result (MATC)	!:.:.:
function	dmatrix_subtract_matrix	(MATA, MATB)	result (MATC)	!:.:.:
function	matrix_return_minus_matrix	(MATA)	result (MATB)	!:.:.:
pure function	real_mult_matrix	(r,MATA)	result (MATB)	!:.:.:
pure function	matrix_mult_real	(MATA, r)	result (MATB)	!:.:.:
pure function	complex_mult_matrix	(r,MATA)	result (MATB)	!:.:.:
pure function	matrix_mult_complex	(MATA, r)	result (MATB)	!:.:.:
pure function	matrix_mult_array2	(MATA, C)	result (MATB)	!:.:.:
pure function	array2_mult_matrix	(C, MATA)	result (MATB)	!:.:.:
pure function	matrix_mult_matrix	(MATA, MATB)	result (MATC)	!:.:.:
pure function	matrix_mult_dmatrix	(MATA, MATB)	result (MATC)	!:.:.:
pure function	dmatrix_mult_matrix	(MATA, MATB)	result (MATC)	!:.:.:
pure function	matrix_divide_real	(MATA, r)	result (MATB)	!:.:.:
pure function	matrix_divide_complex	(MATA, r)	result (MATB)	!:.:.:
pure subroutine	matrix_mult_matrix_sub	(MATA, MATB, MATC)		!:.:.:
!	Linear Algebra with LAPACK			!:.:
function	matrix_inverse	(MATA)	result (MATB)	!:.:.:
function	matrix_determinant	(MAT)	result(z)	!:.:.:
function	matrix_lndet	(MAT)	result(z)	!:.:.:
function	matrix_Pfaffian	(MAT)	result(z)	!:.:.:
function	matrix_lnPfaffian	(MAT)	result(z)	!:.:.:
function	matrix_eigenvalues	(MAT)	result(vec)	!:.:.:

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function	matrix_eigenvectors	(MATA, vec)	result (MATB)	!:.:.:
!	Misc Procedures			
subroutine	matrix_symmetric_set	(MAT, uplo)		!:.:.:
subroutine	matrix_antisymmetric_set	(MAT, uplo)		!:.:.:
pure function	matrix_diagonal_get	(MAT)	result(vec)	!:.:.:
function	matrix_diagonal_set_from_matrix	(MATA)	result(MATB)	!:.:.:
function	<pre>matrix_diagonal_set_from_vector</pre>	(vec)	result(MAT)	!:.:.:
pure function	matrix_traceless_get	(MAT)	result(MATB)	!:.:.:
pure subroutine	matrix_traceless_set	(MAT)		!:.:.:
pure function	matrix_trace2c	(MAT)	result(r)	!:.:.:
pure function	matrix_trace2	(MAT)	result(r)	!:.:.:
pure function	matrix_trace	(MAT)	result(r)	!:.:.:
function	matrix_norm	(MAT)	result(r)	!:.:.:
subroutine	random_number_matrix	(MAT)		!:.:.:
subroutine	random_number_matrix_gaussian	(MAT, sigma)		!:.:.:
function	matrix_return_real_dmatrix	(MATA)	result(MATB)	!:.:.:
function	matrix_return_imag_dmatrix	(MATA)	result (MATB)	!:.:.:
function	matrix_return_conjg	(MATA)	result (MATB)	!:.:.:
function	matrix return transpose	(MATA)	result (MATB)	!:.:.:
function	matrix_return_hermitian	(MATA)	result (MATB)	!:.:.:
function	matrix_is_hermitian	(MATA)	result(r)	!:.:.:
function	matrix_is_symmetric	(MATA)	result(r)	!:.:.:
function	matrix_is_antisymmetric	(MATA)	result(r)	! : . : . :
function	matrix_is_nan	(MAT)	result(itis)	! : . : . :
!	Math and Array Procedures	, ,		! i . i . i
pure function	matrix_abs	(MAT)	result(MATB)	!:.:.:
pure function	matrix sin	(MAT)	result (MATB)	!:.:.:
pure function	matrix_cos	(MAT)	result (MATB)	!:.:.:
pure function	matrix_exp	(MAT)	result (MATB)	!:.:.:
pure function	matrix_log	(MAT)	result (MATB)	!:.:.:
pure function	matrix_sqrt	(MAT)	result (MATB)	!:.:.:
pure function	matrix_power_integer	(MAT, n)	result (MATB)	!:.:.:
pure function	matrix_power_real	(MAT, n)	result (MATB)	!:.:.:
pure function	matrix_power_complex	(MAT, n)	result (MATB)	!:.:.:
		• • • • • • • • • • • • • • • • • • • •		!:.:::
!	File: matrix_mod_matrix_matrixC	lass.f90		!:.:::
	type/class MatrixClass procedur			
!	Used by Constructors:			! : . : . :
subroutine	matrix_gaussian_set	(MAT, sigma)		!:.:.:
subroutine	matrix_random_set	(MAT)		!:.:.:
subroutine	matrix_metadata_put	(MAT, m, n, is, js, mtype, na	ame)	!:.:.:
pure subroutine	matrix_metadata_copy(MATA,MATB)	, , , , , , , , , , , , , , , , , , , ,	,	!:.:.:
!				! : . : . :
subroutine	matrix_read	(MAT, unit)		!:.:.:
	matrix_save	(MAT, unit, fmt)		!:.:.:
subroutine	matrix_print	(MAT, unit, fmt, form, ips,	,ipe,jps,jpe)	!:.:.:
!		_		! : . : . :
	File: matrix_mod_matrix_dmatrix	.f90	• • • • • • • • • • • • • • • • • • • •	
	type/class DMatrix procedures .			
!	Constructors			! : . : . :
function	matrix_construct_zero_d	(m,n,is,js,mtype,name)	result(MAT)	!:.:.:
function	matrix_construct_array2_d	(C, is, js, mtype, name)	result (MAT)	!:.:.:

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function	matrix_construct_real_d	<pre>(r,m,n,is,js,mtype,name)</pre>		!:.:.:
function	matrix_construct_complex_d	<pre>(r,m,n,is,js,mtype,name)</pre>	result(MAT)	!:.:.:
function	matrix_construct_random_d	<pre>(rtype,m,n,is,js,mtype,name,sigma)</pre>	result(MAT)	!:.:.:
subroutine	matrix_symmetric_set_d	(MAT, uplo)		!:.:.:
!	Operators			
pure subroutine	matrix_assignFrom_matrix_d	(MATB, MATA)		!:.:.:
subroutine	matrix_assignFrom_real_d	(MATB, r)		!:.:.:
subroutine	matrix_assignFrom_complex_d	(MATB, r)		!:.:.:
subroutine	matrix_assignFrom_array2_d	(MATE)	3 L (M3 FFD)	!:.:.:
pure function	real_plus_matrix_d	(r, MATA)	result (MATB)	!:.:.:
pure function	matrix_plus_real_d	(MATA, r)	result (MATB)	!:.:.:
function	matrix_plus_array2_d	(MATA, C)	result (MATB)	!:.:.:
function	array2_plus_matrix_d	(C, MATA)	result (MATE)	!:.:.:
function	matrix_plus_matrix_d	(MATA, MATB)	result (MATC)	!:.:.:
pure function	real_subtract_matrix_d	(r, MATA)	result (MATB)	!:.:.:
pure function	matrix_subtract_real_d	(MATA, r)	result (MATB)	!:.:.:
function	matrix_subtract_array2_d	(MATA, C)	result (MATB)	!:.:.:
function	array2_subtract_matrix_d	(C, MATA)	result (MATB)	!:.:.:
function	matrix_subtract_matrix_d	(MATA, MATB)	result (MATC)	!:.:.:
function	matrix_return_minus_matrix_d	(MATA)	result (MATB)	!:.:.:
pure function	real_mult_matrix_d	(r, MATA)	result (MATB)	!:.:.:
pure function	matrix_mult_real_d	(MATA,r)	result (MATB)	!:.:.:
pure function	complex_mult_matrix_d	(z, MATA)	result (MATB)	!:.:.:
pure function	matrix_mult_complex_d	(MATA, z)	result (MATB)	!:.:.:
function	matrix_mult_array2_d	(MATA, C)	result (MATB)	!:.:.:
function	array2_mult_matrix_d	(C, MATA)	result (MATE)	!:.:.:
function	matrix_mult_matrix_d	(MATA, MATB)	result (MATC)	!:.:.:
pure function	matrix_divide_real_d	(MATA, r)	result (MATB)	!:.:.:
pure subroutine	<pre>matrix_mult_matrix_sub_d Linear Algebra with LAPACK</pre>	(MATA, MATB, MATC)		!:.:.:
function	dmatrix_inverse	(MATA)	result (MATB)	!:.:.:
function	dmatrix_inverse dmatrix_determinant	(MATA)	result(z)	!:.:.:
function	dmatrix_determinant dmatrix_lndet	(MAI)	result(z)	!:.:.:
function		(MAI)	result (vec)	!:.:.:
function	<pre>dmatrix_eigenvalues dmatrix_eigenvectors</pre>	,		
!	Misc Procedures	(MAIA, Vec)	result (MATB)	! : . : . :
subroutine	dmatrix_antisymmetric_set	(MAT, uplo)		!:.:.:
pure function	dmatrix_diagonal_get	(MAT)	result(vec)	!:.:.:
function	dmatrix_diagonal_set_from_dmatrix	(MATA)	result (MATB)	!:.:.:
function	dmatrix_diagonal_set_from_dvector	(vec)	result (MAT)	!:.:.:
pure function	dmatrix_traceless_get	(MAT)	result (MATB)	!:.:.:
pure subroutine	dmatrix_traceless_set	(MAT)	resurc (MAID)	!:.:.:
pure function	dmatrix_trace2c	(MAT)	result(r)	!:.:.:
pure function	dmatrix_trace2	(MAT)	result(r)	!:.:.:
pure function	dmatrix_trace	(MAT)	result(r)	!:.:.:
function	matrix_norm_d	(MAT)	result(r)	!:.:.:
subroutine	random_number_dmatrix	(MAT)	100010(1)	!:.:.:
subroutine	random_number_dmatrix_gaussian	(MAT, sigma)		!:.:.:
function	matrix_return_transpose_d	(MATA)	result(MATB)	!:.:.:
function	dmatrix_dmatrix_complex_return_matrix	(MATA, MATB)	result (MATC)	!:.:.:
function	dmatrix is symmetric	(MATA)	result(r)	!:.:.:
function	dmatrix_is_antisymmetric	(MATA)	result(r)	!:.:.:
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function	dmatrix_is_nan	(MAT)	result(itis)	!:.:.:
!	Math and Array Procedures			! ! . ! . !
pure function	dmatrix_abs	(MAT)	result (MATB)	!:.:.:
pure function	dmatrix_sin	(MAT)	result (MATB)	!:.:.
pure function	dmatrix_cos	(MAT)	result (MATB)	!:.:.
pure function	dmatrix_exp	(MAT)	result (MATB)	!:.:.
pure function	dmatrix_log	(MAT)	result (MATB)	!:.:.
pure function	dmatrix_sqrt	(MAT)	result (MATB)	!:.:.
pure function	dmatrix_power_integer	(MAT, n)	result (MATB)	!:.:.:
pure function	dmatrix_power_real	(MAT,n)	result (MATB)	!:.:.:
! <sup>*</sup>				! : . : . :
!	File: matrix_mod_matrix_vector.	f90		! : . : . :
!	type/class Vector procedures			! : . : . :
pure subroutine	vector_metadata_put	(vec,n,is,name)		!:.:.:
pure function	vector_construct_zero	(n,is,name)	result(vec)	!:.:.:
pure function	vector_construct_real	(n,r,is,name)	result (vec)	!:.:.:
pure function	vector_construct_complex	(n,z,is,name)	result (vec)	!:.:.:
pure function	vector_construct_array1	(C, is, name)	result (vec)	!:.:.:
function	vector_construct_random	(rtype, n, is, name, sigma)		!:.:.:
!	Procedures			! : . : . :
function	vector_sort	(veca, by)	result (vecb)	!:.:.:
pure function	vector dot product	(veca, vecb)	result(r)	!:.:.:
subroutine	vector random set	(vec)	( - /	!:.:.:
subroutine	vector_gaussian_set	(vec, sigma)		!:.:.:
subroutine	random_number_vector_gaussian_set	(vec, sigma)		!:.:.:
pure subroutine	vector_metadata_copy_vector	(veca, vecb)		!:.:.:
pure subroutine	vector_metadata_copy_dvector	(veca, vecb)		! : . : . :
pure subroutine	dvector_metadata_copy_vector	(veca, vecb)		!:.:.:
pure subroutine	dvector_metadata_copy_dvector	(veca, vecb)		!:.:.:
pure function	vector norm	(vec)	result(r)	!:.:.:
pure function	vector_return_real_dvector	(vec)	result (vecb)	!:.:.:
pure function	vector_return_imag_dvector	(vec)	result (vecb)	!:.:.:
pure function	vector_return_return_conjg	(vec)	result (vecb)	!:.:.:
! <sup>†</sup>	Operators			! : . : . :
pure subroutine	vector_assignFrom_vector	(vecb, veca)		!:.:.:
pure subroutine	vector_assignFrom_real	(vecb, r)		!:.:.:
pure subroutine	vector_assignFrom_complex	(vecb,r)		!:.:.:
pure subroutine	vector_assignFrom_array1	(vecb, v)		!:.:.:
pure subroutine	vector_assignFrom_array1_d	(vecb, v)		!:.:.:
pure subroutine	vector assignFrom dvector	(vecb, veca)		!:.:.:
pure function	real_plus_vector	(r, veca)	result (vecb)	!:.:.:
pure function	vector_plus_real	(veca,r)	result (vecb)	!:.:.:
pure function	complex_plus_vector	(z,veca)	result (vecb)	!:.:.:
pure function	vector_plus_complex	(veca, z)	result (vecb)	!:.:.:
pure function	vector_plus_array1	(veca, v)	result (vecb)	! : . : . :
pure function	array1_plus_vector	(v, veca)	result (vecb)	!:.:.:
pure function	vector_plus_array1_d	(veca, v)	result (vecb)	!:.:.:
pure function	array1_d_plus_vector	(veca)	result (vecb)	!:.:.:
pure function	vector_plus_vector	(veca, vecb)	result (vecc)	!:.:.:
pure function	vector_plus_dvector	(veca, vecb)	result (vecc)	!:.:.:
pure function	dvector_plus_vector	(veca, vecb)	result (vecc)	!:.:.:
Pare ranceron	4.00001_b10000001	(veca, veca)	robure (vece)	

! Procedures !::::	May 17, 22 3:07	matrix_pro	oclist	Pa	ige 11/14
Pure function   complex_subtract_vector   (r, veca)   result(vecb)   1:::   pure function   vector_subtract_acrayl   (veca,C)   result(vecb)   1:::   veca,C    result(vecb)   1:::   veca,C	1	real_subtract_vector	(r,veca)	result(vecb)	!:.:.:
Dure function   vector_subtract_complex   (veca_r)   result(vecb)	_ ±				
Dure function   vector_subtract_array    (veca, C)   result(vecb)			The state of the s	` ,	
Dure function   array _subtract_vector   (C, veca)   result(vecb)   ::::   pure function   array _d, subtract_vector   (C, veca)   result(vecb)   :::   pure function   array _d, subtract_vector   (C, veca)   result(vecb)   :::   pure function   array _d, subtract_vector   (veca, vecb)   result(vecb)   :::   pure function   vector_subtract_vector   (veca, vecb)   result(vecc)   :::   pure function   vector_subtract_vector   (veca, vecb)   result(vecc)   :::   pure function   vector_subtract_vector   (veca, vecb)   result(vecc)   :::   veca    result(veccc)   :::   veca    result(veccc)   :::   veca    result(vecccc)   :::   veca    result(vecccccccccccccccccccccccccccccccccccc					
Dure function   vector_subtract_serayl_d   veca, C   result(vecb)			(veca,C)	result(vecb)	
Dure function   arrayl_d_subtract_vector   (c, veca)   result(vecc)   ::::   pure function   vector_subtract_vector   (veca, vecb)   result(vecc)   ::::   pure function   vector_subtract_vector   (veca, vecb)   result(vecc)   ::::   pure function   vector_subtract_vector   (veca, vecb)   result(vecc)   ::::   pure function   vector_subtract_vector   (veca)   result(vecb)   ::::   pure function   vector_subtract_vector   (veca)   result(vecb)   ::::   pure function   vector_mult_real   (veca, r)   result(vecb)   ::::   pure function   vector_mult_real   (veca, r)   result(vecb)   ::::   pure function   vector_mult_mult_vector   (veca, r)   result(vecb)   ::::   veca, r)   result(vecb)   :::   veca, r)   result(vecb)   :::	pure function	array1_subtract_vector	(C, veca)	result(vecb)	!:.:.:
Dure function   Vector_subtract_vector   (Veca, vecb)   result(vecc)	_ ±			` ,	
pure function         vector_subtract_vector         (veca, vecb)         result(vecc)         ::::           pure function         vector_return_minus_vector         (veca)         result(vecb)         !:::           pure function         vector_return_minus_vector         (veca,)         result(vecb)         !:::           pure function         vector_mult_real         (veca,r)         result(vecb)         !:::           pure function         vector_mult_vector         (veca,r)         result(vecb)         !:::           pure function         vector_mult_vector         (veca,r)         result(vecb)         !:::           pure function         vector_mult_vector         (veca,r)         result(vecb)         !:::           pure function         vector_divide_real         (veca,r)         result(vecb)         !:::           pure function         vector_divide_complex         (veca,r)         result(vecb)         !::           pure function         vector_divide_complex         (veca,r)         result(vecb)         !::           pure subroutine         matrix_mult_vector_sub         (veca,r)         result(vecb)         !::           pure subroutine         vector_all         (vec)         result(vecb)         !::           pure function         vector			(C, veca)		
Dure function   dvector_subtract_vector   (veca, vecb)   result(vecb)		vector_subtract_vector	(veca, vecb)	result(vecc)	
pure function         vector_return_minus_vector         (veca)         result(vecb)         !:::           pure function         vector_mult_real         (veca,r)         result(vecb)         !:::           pure function         vector_mult_vector         (veca,r)         result(vecb)         !:::           pure function         vector_mult_complex         (veca,r)         result(vecb)         !:::           function         vector_mult_matrix         (vecb,MATA)         result(vecc)         !:::           function         vector_mult_matrix         (veca,r)         result(vecb)         !:::           pure function         vector_divide_complex         (veca,r)         result(vecb)         !:::           pure function         vector_divide_complex         (veca,r)         result(vecb)         !:::           pure function         vector_divide_complex         (veca,r)         result(vecb)         !:::           pure subroutine         vector_divide_complex         (veca,r)         result(vecb)         !:::           pure subroutine         vector_idivide_complex         (veca,r)         result(vecb)         !:::           pure function         vector_ass         (vec,mATA, vecb, vecc)         !:::           pure function         vector_subroutine	_ ±			` ,	
pure function         real_mult_vector         (r,veca)         result(vecb)         ::::           pure function         complex_mult_vector         (r,veca)         result(vecb)         ::::           pure function         complex_mult_vector         (r,veca)         result(vecb)         ::::           function         matrix_mult_vector         (MATA,vecb)         result(vecc)         ::::           function         vector_mult_matrix         (vecb,MATA)         result(vecb)         ::::           pure function         vector_divide_complex         (veca,r)         result(vecb)         ::::           pure subroutine         matrix_mult_vector_sub         (veca,r)         result(vecb)         ::::           pure subroutine         vector_sin         (vec), MATA,vecb,vecc)         ::::         veclut(vecb)         ::::           pure function         vector_sin         (vec), matrix_vector         ::::         vecult(vecb)         :::: <t< td=""><td></td><td></td><td></td><td></td><td></td></t<>					
pure function vector mult_real         (veca, r)         result(vecb)         ::::           pure function complex mult_vector         (r, veca)         result(vecb)         ::::           function         vector_mult_complex         (veca, r)         result(vecb)         ::::           function         vector_mult_matrix         (vecb, MATA)         result(vecc)         ::::           pure function         vector_divide_real         (veca, r)         result(vecb)         ::::           pure subroutine         matrix_mult_vector_sub         (MATA, vecb, vecc)         ::::           pure subroutine         vector_mult_matrix_sub         (vecb, MATA, vecc)         ::::           pure subroutine         vector_mult_matrix_sub         (vecb, MATA, vecc)         ::::           pure subroutine         vector_sub         (vecb, MATA, vecc)         ::::           pure function         vector_abs         (vecb, MATA, vecc)         ::::           pure function         vector_abs         (vec)         result(vecb)         ::::           pure function         vector_abs         (vec)         result(vecb)         ::::           pure function         vector_cos         (vec)         result(vecb)         ::::           pure function         vector_metal	_ ±	vector_return_minus_vector	(veca)	result(vecb)	!:.:.:
pure function         complex_mult_vector         (r, veca)         result(vecb)         ::::           function         matrix_mult_complex         (veca,r)         result(vecc)         !:::           function         wetor_mult_matrix         (vecb_MATA)         result(vecc)         !:::           pure function         vector_divide_real         (veca,r)         result(vecb)         !:::           pure subroutine         matrix_mult_vector_sub         (wea,r)         result(vecb)         !:::           pure subroutine         matrix_mult_vector_sub         (MATA, vecb, vecc)         !:::           pure subroutine         wetor_abs         (vecb_MATA, vecc)         !:::           pure subroutine         vector_cos         (vec, MATA, vecc)         !:::           pure function         vector_sin         (vec)         result(vecb)         !:::           pure function         vector_sin         (vec)         result(vecb)         !:::           pure function         vector_sin         (vec)         result(vecb)         !:::           pure function         vector_sper         (vec)         result(vecb)         !:::           pure function         vector_sper         (vec, n)         result(vec)         !:::           pure functi	pure function		(r,veca)	result(vecb)	!:.:.:
pure function         vector_mult_complex         (veca,r)         result(vecb)         !           function         matrix_mult_vector         (MATA,vecb)         result(vecc)         !           function         vector_mult_matrix         (vecb, MATA)         result(vecb)         !           pure function         vector_divide_complex         (veca,r)         result(vecb)         !           pure subroutine         matrix_mult_vector_sub         (WaTA,vecb,vec)         !           pure subroutine         vector_mult_matrix_sub         (vecb,MATA,vec)         !           pure function         vector_malt_matrix_sub         (vec)         result(vecb)         !           pure function         vector_abs         (vec)         result(vecb)         !           pure function         vector_sab         (vec)         result(vecb)         !           pure function         vector_sab         (vec)         result(vecb)         !           pure function         vector_eas         (vec)         result(vecb)         !           pure function         vector_sqt         (vec, m         result(vecb)         !           pure function         vector_sqt         (vec, m         result(vecb)         ! <t< td=""><td></td><td></td><td>(veca,r)</td><td>result(vecb)</td><td></td></t<>			(veca,r)	result(vecb)	
function matrix_mult_vector (MATA, vecb) result(vecc) !::: pure function vector_divide_real (veca,r) result(vecb) !::: pure function vector_divide_complex (veca,r) result(vecb) !::: pure subroutine vector_mult_matrix_sub (veca,r) result(vecb) !::: pure subroutine vector_mult_matrix_sub (MATA, vecb, vecc) (vecb, MATA, vecb, vecc) !::: pure function vector_abs (vec) result(vecb) !::: pure function vector_abs (vec) result(vecb) !::: pure function vector_sin (vec) result(vecb) !::: pure function vector_cos (vec) result(vecb) !::: pure function vector_cos (vec) result(vecb) !::: pure function vector_spr (vec) result(vecb) !::: pure function vector_log (vec) result(vecb) !::: pure function vector_log (vec) result(vecb) !::: pure function vector_power_integer (vec) result(vecb) !::: pure function vector_power_real (vec,n) result(vecb) !::: pure function vector_power_complex (vec,n) result(vecb) !::: pure function vector_power_complex (vec,n) result(vecb) !::: function vector_power_complex (vec,n) result(vecb) !::: function vector_save (vec,n) result(vecb) !::: subroutine vector_save (vec,unit)   subroutine vector_power_complex (vec,unit, function, name, ips, ipe) !:::		complex_mult_vector	(r,veca)	result(vecb)	
function         vector_mult_matrix         (vecd, MATA)         result(vec)         !::: pure function         vector_divide_real         (veca,r)         result(vecb)         !::: pure function         vector_divide_complex         (veca,r)         result(vecb)         !::: pure subroutine         vector_mult_matrix_sub         (WATA, vecb, vecc)         !::: pure subroutine         vector_mult_matrix_sub         (vecb, MATA, vecc)         !::: pure function         vector_subs         !::: pure function         vector_abs         !::: pure function         vector_abs         !::: pure function         vector_sub (vecb)         !::: pure function         vector_sub (vecb)         !::: pure function         vector_cos         (vec)         result(vecb)         !::: pure function         vector_cos         (vec)         result(vecb)         !::: pure function         vector_sub (vecb)         !::: pure function         vector_save         vector_sub (vecb)         !::: pure function			(veca,r)	result(vecb)	!::::
pure function         vector_divide_complex         (veca,r)         result(vecb)         !           pure subroutine         matrix_mult_vector_sub         (wecb, wecc)         !           pure subroutine         matrix_mult_vector_sub         (vecb,MATA, vecb, wecc)         !           !         Math         (vecb,MATA, vecb, wecc)         !           !          Math         (vecb,MATA, vecb, wecc)         !           pure function         vector_abs         (vec,MATA, vecb, wecc)         !           pure function         vector_abs         (vec)         result(vecb)         !           pure function         vector_sin         (vec)         result(vecb)         !           pure function         vector_exp         (vec)         result(vecb)         !           pure function         vector_lexp         (vec)         result(vecb)         !           pure function         vector_lexp         (vec)         result(vecb)         !           pure function         vector_syst         (vec,n)         result(vecb)         !           pure function         vector_explant         (vec,n)         result(vecb)         !           pure function         vector_isant         (		matrix_mult_vector	(MATA, vecb)	result(vecc)	
pure function         vector_divide_complex         (veca,r)         result(vecb)         !           pure subroutine         matrix_mult_vector_sub         (MATA, vecb, vecc)         !           pure function         vector_abs         (vec)         result(vecb)         !           pure function         vector_sin         (vec)         result(vecb)         !           pure function         vector_exp         (vec)         result(vecb)         !           pure function         vector_sqt         (vec)         result(vecb)         !           pure function         vector_sqt         (vec, n)         result(vecb)         !           pure function         vector_power_real         (vec, n)         result(vecb)         !           pure function         vector_san         (vec, n)         result(vecb)         !           function         vector_san         (vec, unit, fmt)         !           subroutine         vec	function		(vecb, MATA)	result(vecc)	!:.:.:
pure subroutine pure function pure function vector_abs         (vec) result(vecb) (vec)	pure function	vector_divide_real	(veca,r)	result(vecb)	!:.:.:
	pure function	vector_divide_complex	(veca,r)	result(vecb)	!:.:.:
pure function vector_abs (vec) result(vecb)  ; pure function vector_sin (vec) result(vecb)  ; pure function vector_cos (vec) result(vecb)  ; pure function vector_exp (vec) result(vecb)  ; pure function vector_exp (vec) result(vecb)  ; pure function vector_log (vec) result(vecb)  ; pure function vector_sqrt (vec) result(vecb)  ; pure function vector_power_integer (vec,n) result(vecb)  ; pure function vector_power_real (vec,n) result(vecb)  ; pure function vector_power_complex (vec,n) result(vecb)  ; pure function vector_to_nower_complex (vec,n) result(vecb)  ; function vector_is_nan (vec,n) result(vecb)  ; subroutine vector_read (vec,nit)  ; subroutine vector_read (vec,nit)  ; subroutine vector_print (vec,nit,fmt)  ; subroutine vector_print (vec,nit,fmt,form,name,ips,ipe)  ;	pure subroutine	matrix_mult_vector_sub	(MATA, vecb, vecc)		!:.:.:
pure function         vector_abs         (vec)         result(vecb)         :           pure function         vector_sin         (vec)         result(vecb)         :           pure function         vector_cos         (vec)         result(vecb)         :           pure function         vector_log         (vec)         result(vecb)         :           pure function         vector_sqt         (vec)         result(vecb)         :           pure function         vector_power_integer         (vec,n)         result(vecb)         :           pure function         vector_power_real         (vec,n)         result(vecb)         :           pure function         vector_power_complex         (vec,n)         result(vecb)         :           pure function         vector_isan         (vec,n)         result(vecb)         :           subroutine         vector_isan         (vec,unit,fint)         :           subroutine         vector_save         (vec,unit,fint)         :           subroutine         vector_print         (vec,unit,fint,form,name,ips,ipe)         :                 pure subroutine         dector_metadata_put         (vec,n,is,name)	pure subroutine	vector_mult_matrix_sub	(vecb, MATA, vecc)		!:.:.:
vector   v	!	Math and Array Procedures			!:.::
pure function         vector_cos         (vec)         result(vecb)         :           pure function         vector_exp         (vec)         result(vecb)         !           pure function         vector_lower         (vec)         result(vecb)         !           pure function         vector_power_integer         (vec, n)         result(vecb)         !           pure function         vector_power_cal         (vec, n)         result(vecb)         !           pure function         vector_power_complex         (vec, n)         result(vecb)         !           function         vector_save         (vec, n)         result(vecb)         !           subroutine         vector_save         (vec, unit, fmt)         !           subroutine         vector_save         (vec, unit, fmt, form, name, ips, ipe)         !           !         File: matrix_mod_matrix_dvector.f90         !         !           !         Constructors         (vec, n, is, name)         !           pure subroutine         dvector_metadata_put         (vec, n, is, name)         !           pure function         dvector_construct_zero         (n, r, is, name)         result(vec)         !           pure function         dvector_c	pure function	vector_abs	(vec)	result(vecb)	!:.:.:
pure function         vector_exp         (vec)         result(vecb)         !::           pure function         vector_log         (vec)         result(vecb)         !:           pure function         vector_sqt         (vec, n)         result(vecb)         !:           pure function         vector_power_enal         (vec, n)         result(vecb)         !:           pure function         vector_power_complex         (vec, n)         result(vecb)         !:           pure function         vector_sane         (vec, n)         result(vecb)         !:           subroutine         vector_read         (vec, unit)         !:           subroutine         vector_save         (vec, unit, fmt)         !:           subroutine         vector_print         (vec, unit, fmt, form, name, ips, ipe)         !:           !              subroutine         vector_print         (vec, unit, fmt)         !:	pure function	vector_sin	(vec)	result(vecb)	!:.:.:
pure function         vector_log         (vec)         result(vecb)         !::           pure function         vector_sqrt         (vec, n)         result(vecb)         !::           pure function         vector_power_integer         (vec, n)         result(vecb)         !::           pure function         vector_power_complex         (vec, n)         result(vecb)         !::           pure function         vector_power_complex         (vec, n)         result(vecb)         !::           function         vector_sear         (vec, unit)         !::           subroutine         vector_save         (vec, unit, fmt)         !::           subroutine         vector_print         (vec, unit, fmt)         !::           !         File: matrix_mod_matrix_dvector.f90         !::           !         type/class DVector procedures         !::           !         Constructors         !::           pure subroutine         dvector_metadata_put         (vec, n, is, name)         result(vec)           pure function         dvector_construct_zero         (n, is, name)         result(vec)           pure function         dvector_construct_zeral         (n, z, is, name)         result(vec)           pure function         dvect	pure function	vector_cos	(vec)	result(vecb)	
pure function vector_sqst (vec) result(vecb) !:: pure function vector_power_integer (vec,n) result(vecb) !:: pure function vector_power_real (vec,n) result(vecb) !:: pure function vector_power_complex (vec,n) result(vecb) !:: pure function vector_power_complex (vec,n) result(vecb) !::  !	pure function	vector_exp	(vec)	result(vecb)	!:.:.:
pure function vector_sqst (vec) result(vecb) !:: pure function vector_power_integer (vec,n) result(vecb) !:: pure function vector_power_real (vec,n) result(vecb) !:: pure function vector_power_complex (vec,n) result(vecb) !:: pure function vector_power_complex (vec,n) result(vecb) !::  !	pure function	vector_log	(vec)	result (vecb)	!:.:.:
pure function         vector_power_real         (vec,n)         result(vecb)         !:           pure function         vector_power_complex         (vec,n)         result(vecb)         !:           !              !:          !:          !:          !:          !:          !:          !:            !:  <	pure function	vector_sqrt	(vec)	result(vecb)	
pure function vector_power_complex (vec,n) result(vecb) !::	pure function	vector_power_integer	(vec, n)	result(vecb)	!:.:.:
pure function vector_power_complex (vec,n) result(vecb) !:::  !	pure function	vector_power_real	(vec, n)	result (vecb)	!:.:.:
function vector_is_nan vector_read (vec, unit) subroutine vector_read (vec, unit) subroutine vector_save (vec, unit, fmt) subroutine vector_print (vec, unit, fmt, form, name, ips, ipe)  !  File: matrix_mod_matrix_dvector.f90 !  type/class DVector procedures !  Constructors  pure subroutine dvector_metadata_put (vec, n, is, name) pure function dvector_construct_zero (n, is, name) result(vec) pure function dvector_construct_real (n, r, is, name) result(vec) pure function dvector_construct_array1 (C, is, name) result(vec) function dvector_construct_random (rtype, n, is, name, sigma) result(vec) !  Procedures	pure function	vector_power_complex	(vec, n)	result(vecb)	
subroutinevector_read(vec, unit)subroutinevector_save(vec, unit, fmt)vector_print(vec, unit, fmt, form, name, ips, ipe)!File: matrix_mod_matrix_dvector.f90!type/class DVector procedures!Constructorspure subroutinedvector_metadata_put(vec, n, is, name)pure functiondvector_construct_zero(n, is, name)result(vec)pure functiondvector_construct_real(n, r, is, name)result(vec)pure functiondvector_construct_complex(n, z, is, name)result(vec)pure functiondvector_construct_arrayl(C, is, name)result(vec)functiondvector_construct_random(rtype, n, is, name, sigma)result(vec)!Procedures!	!	Utilities			
subroutinevector_save(vec, unit, fmt)!::::subroutinevector_print(vec, unit, fmt, form, name, ips, ipe)!::::!!!!pure subroutinedvector_metadata_put(vec, n, is, name)!:::pure functiondvector_construct_zero(n, is, name)result(vec)!:::pure functiondvector_construct_real(n, r, is, name)result(vec)!:::pure functiondvector_construct_complex(n, z, is, name)result(vec)!:::pure functiondvector_construct_array1(C, is, name)result(vec)!:::functiondvector_construct_array1(C, is, name, sigma)result(vec)!:::functiondvector_construct_random(rtype, n, is, name, sigma)result(vec)!:::	function	vector_is_nan	(vec)	result(itis)	!:.:.:
subroutine vector_print (vec, unit, fmt, form, name, ips, ipe) !::::	subroutine	vector_read	(vec, unit)		!:.:.:
!	subroutine	vector_save	(vec, unit, fmt)		
!	subroutine	vector_print	(vec, unit, fmt, form, name,	ips, ipe)	!:.:.:
!	!	- 			! : . : . : '
!	!	File: matrix_mod_matrix_dvector.f90			! : . : . :
!	!	type/class DVector procedures			!:.:::
pure functiondvector_construct_zero(n,is,name)result(vec)!:.::pure functiondvector_construct_real(n,r,is,name)result(vec)!:.::pure functiondvector_construct_complex(n,z,is,name)result(vec)!:.::pure functiondvector_construct_array1(C,is,name)result(vec)!:.::functiondvector_construct_random(rtype,n,is,name,sigma)result(vec)!:.::!Procedures!:.::	!	Constructors			!:.::
pure functiondvector_construct_zero(n,is,name)result(vec)!:.::pure functiondvector_construct_real(n,r,is,name)result(vec)!:.::pure functiondvector_construct_complex(n,z,is,name)result(vec)!:.::pure functiondvector_construct_array1(C,is,name)result(vec)!:.::functiondvector_construct_random(rtype,n,is,name,sigma)result(vec)!:.::!Procedures!:.::	pure subroutine	dvector_metadata_put	(vec, n, is, name)		!:.:.:
pure functiondvector_construct_complex(n,z,is,name)result(vec)!:.::pure functiondvector_construct_array1(C,is,name)result(vec)!:.::functiondvector_construct_random(rtype,n,is,name,sigma)result(vec)!:.::!:!:.::	pure function	dvector_construct_zero	(n,is,name)	result(vec)	!:.:.:
pure functiondvector_construct_complex(n,z,is,name)result(vec)!:.::pure functiondvector_construct_array1(C,is,name)result(vec)!:.::functiondvector_construct_random(rtype,n,is,name,sigma)result(vec)!:.::!:!:.::					!:.:.:
pure functiondvector_construct_array1(C,is,name)result(vec)!:.::functiondvector_construct_random(rtype,n,is,name,sigma)result(vec)!:.::!Procedures!::::	pure function				
function dvector_construct_random (rtype,n,is,name,sigma) result(vec) !::::					
! Procedures!::::	function	dvector_construct_random	<pre>(rtype,n,is,name,sigma)</pre>	result (vec)	!:.:.:
	!				
<pre>pure function dvector_maxval (veca,mask) result(r) !:.::</pre>	pure function	dvector_maxval	(veca, mask)	result(r)	!:.:.:
		dvector_minval			!:.:.:
		dvector_dot_product	(veca, vecb)		!:.:::
		dvector_random_set	(vec)		!:.:.:

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subroutine	dvector_gaussian_set	(vec, sigma)		!:.:.:
subroutine	random_number_dvector_gaussian_set	(vec, sigma)		!:.:.:
pure function	dvector_norm	(vec)	result(r)	!:.:.:
function	dvector_sort	(veca, by)	result (vecb)	!:.:.:
function	dvector_dvector_complex_return_vector	(veca, vecb)	result (vecc)	!:.:.:
!	Operators			! : . : . :
pure subroutine	dvector_assignFrom_vector	(vecb, veca)		!:.:.:
pure subroutine	dvector_assignFrom_real	(vecb, r)		!:.:.:
pure subroutine	dvector_assignFrom_complex	(vecb, r)		!:.:.:
pure subroutine	dvector_assignFrom_array1	(vecb, v)		!:.:.:
pure subroutine	dvector_assignFrom_array1_d	(vecb, v)		!:.:.:
pure function	real_plus_dvector	(r, veca)	result (vecb)	!:.:.:
pure function	dvector_plus_real	(veca,r)	result (vecb)	!:.:.:
pure function	dvector_plus_array1_d	(veca, v)	result (vecb)	!:.:.:
pure function	array1_d_plus_dvector	(v, veca)	result (vecb)	!:.:.:
pure function	dvector_plus_dvector	(veca, vecb)	result (vecc)	!:.:.:
pure function	real_subtract_dvector	(r, veca)	result (vecb)	!:.:.:
pure function	dvector_subtract_real	(veca,r)	result (vecb)	!:.:.:
pure function	dvector_subtract_array1_d	(veca,C)	result (vecb)	!:.:.:
pure function	array1_d_subtract_dvector	(C, veca)	result (vecb)	!:.:.:
pure function	dvector subtract dvector	(veca, vecb)	result (vecc)	!:.:.:
pure function	dvector_return_minus_dvector	(veca)	result (vecb)	!:.:.:
pure function	real_mult_dvector	(r,veca)	result (vecb)	!:.:.:
pure function	dvector_mult_real	(veca,r)	result (vecb)	!:.:.:
function	dmatrix_mult_dvector	(MATA, vecb)	result (vecc)	!:.:.:
function	dvector_mult_dmatrix	(vecb, MATA)	result (vecc)	!:.:.:
pure function	dvector_divide_real	(veca,r)	result (vecb)	!:.:.:
pure subroutine	matrix_mult_vector_sub_d	(MATA, vecb, vecc)		!:.:.:
pure subroutine	vector_mult_matrix_sub_d	(vecb, MATA, vecc)		!:.:.:
! <sup>*</sup>	Math and Array Procedures			! ! . ! . !
pure function	dvector_abs	(vec)	result(vecb)	!:.:.:
pure function	dvector_sin	(vec)	result (vecb)	!:.:.:
pure function	dvector_cos	(vec)	result (vecb)	!:.:.:
pure function	dvector_exp	(vec)	result (vecb)	!:.:.:
pure function	dvector_log	(vec)	result (vecb)	!:.:.:
pure function	dvector_sqrt	(vec)	result (vecb)	!:.:.:
pure function	dvector_power_integer	(vec,n)	result (vecb)	!:.:.:
pure function	dvector_power_real	(vec, n)	result (vecb)	!:.:.:
!		( , , , , , , , , , , , , , , , , , , ,		! : . : . :
function	dvector_is_nan	(vec)	result(itis)	!:.:.:
subroutine	dvector_read	(vec,unit)	100010 (1010)	!:.:.:
subroutine	dvector_save	(vec, unit, fmt)		!:.:.:
subroutine	dvector_print	(vec, unit, fmt, form,	name.ips.ipe)	!:.:.:
!	File: matrix_mod_array_lapack.f90	)		! : . : . : ! : . : . :
!	Matrix Matrix Multiplication			! : . : . :
pure function	array2_matmul_lapack_mm	(A,B,mtype)	result(C)	!:.:.:
call zhemm(side,		! A is assumed Hermitian		!:.:.:
	opB ,mc,nc,na,alpha,A,ma,B,mb,beta,C,mc)			!:.:.:
pure function '	array2_matmul_lapack_dd	(A,B,mtype)	result(C)	!:.:.:
call dsymm(side,	uplo, mc, nc , alpha, A, ma, B, mb, beta, C, mc)	! A is assumed Symmetric		!:.:.:

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call dgemm(opA, opB, mc, nc, na, alpha, A, ma, B, mb, beta, C, mc)			!:.::				
<pre>pure function array2_matmul_lapack_m</pre>	(A, side)	result(C)	!:.:.:				
call zherk(uplo, opA ,N,K,alpha,A,ma,beta,C,N)			!:.:.:				
pure function array2_matmul_lapack_d	(A, side)	result(C)	!:.:.:				
call dsyrk(uplo, opA ,N,K,alpha,A,ma,beta,C,N) ! Matrix Vector Multiplication			!:.:.:				
pure function array2_matmul_lapack_mv	(A, v, type)		   :.:.:				
call zgemv(tp,ma,na,alpha,A,ma,v,incx,beta,w,incy)	(A, V, Cype)	resurc(w)	!:.:.:				
call zhemv(uplo ,ma,alpha,A,ma,v,incx,beta,w,incy)			!:.:.:				
pure function array2_matmul_lapack_dv	(A, v, type)	result(w)	!:.:.:				
call dgemv(tp, ma, na, alpha, A, ma, v, incx, beta, w, incy)	( ) ( ) ( )	,					
call dgemv(tp,ma,na,alpha,A,ma,v,incx,beta,w,incy) ! Matrix Matrix Multiplication Subroutines							
<pre>pure subroutine array2_matmul_lapack_mm_sub</pre>	(A,B,C,mtype)		!:.:.:				
call zhemm(side,uplo,mc,nc ,alpha,A,ma,B,mb,beta,C,mc)	! A is assumed Hermitian		!:.:.:				
call zgemm(opA, opB, mc, nc, na, alpha, A, ma, B, mb, beta, C, mc)			!:.:.:				
pure subroutine array2_matmul_lapack_dd_sub	(A,B,C,mtype)		!:.:.:				
call dsymm(side,uplo,mc,nc ,alpha,A,ma,B,mb,beta,C,mc)	! A is assumed Symmetric		!:.:.:				
call dgemm(opA ,opB ,mc,nc,na,alpha,A,ma,B,mb,beta,C,mc) pure subroutine array2_matmul_lapack_m_sub	(A,C,side)		!:.:.: !:.:.:				
call zherk(uplo, opA, N, K, alpha, A, ma, beta, C, N)	(A, C, Side)		!:.:.:				
pure subroutine array2_matmul_lapack_d_sub	(A,C,side)		! : . : . :				
call devrk(uplo on A N K alpha A ma beta C N)			1				
! Matrix Vector Multiplication Sub	oroutines						
<pre>pure subroutine array2_matmul_lapack_mv_sub</pre>	(A, v, w, type)		!:.:.:				
call zgemv(tp,ma,na,alpha,A,ma,v,incx,beta,w,incy)			!:.:.:				
call zhemv(uplo ,ma,alpha,A,ma,v,incx,beta,w,incy)			!:.:.:				
<pre>pure subroutine array2_matmul_lapack_vm_sub</pre>	(v, A, w)		!:.:.:				
call zgemv(tp, ma, na, alpha, A, ma, v, incx, beta, w, incy)	<b>4-</b>		!:.:.:				
pure subroutine array2_matmul_lapack_dv_sub	(A, v, w, type)		!:.:.:				
call dgemv(tp,ma,na,alpha,A,ma,v,incx,beta,w,incy)	( 7)		!:.:.:				
pure subroutine array2_matmul_lapack_vd_sub	(v, A, w)		!:.:.:				
call dgemv(tp,ma,na,alpha,A,ma,v,incx,beta,w,incy) ! Matrix Inversion!::::							
function array2_inverse	(C)	result(CI)	!:.:.:				
call zgetrf(n,n,CI,n,ipiv,info)	(0)	100010 (01)	!:.:.:				
call zgetri(n,CI,n,ipiv,WORK ,LWORK,info)			!:.:.:				
function array2_inverse_d	(C)	result(CI)	!:.:.:				
<pre>call dgetrf(n,n,CI,n,ipiv,info)</pre>			!:.:.:				
call dgetri(n,CI,n,ipiv,WORK ,LWORK,info)			!:.:.:				
! Eigenvalues - Eigenvectors		• • • • • • • • • • • • • • • • • • • •					
function array2_eigenvalues	(C, mtype)	result (eigenval)	!:.:.:				
function array2_eigenvalues function array2_eigenvectors function array2_eigenvalues_d	(C,mtype) (C,mtype) (C,mtype)	result (evs)	!:.:.:				
function array2_eigenvalues_d			!:.:.:				
function array2_eigenvectors_d subroutine array2_zgeev	(C,mtype) (C,eigenval,eigenvec,job	result(evs)	!:.:.: !:.:.:				
	(C,elgenval,elgenvec,job,LWORK,RWORK,info)	,	!:.:.:				
subroutine array2_zheev	(C,eigenval,eigenvec,job	)	!:.:.:				
call zheev (JOBZ, UPLO, n, A, n, EV, WORK , LWORK, RWORK, info)	(o, ergenvar, ergenvee, job	,	!:.:.:				
subroutine array2_dgeev	(C, eigenval, eigenvec, job	)	!:.:.:				
call dgeev(JOBVL, JOBVR, n, A, n, ReEV, ImEV, VL, LDVL, VR, LDVL, WC			!:.:.:				
subroutine array2_dsyev	(C, eigenval, eigenvec, job	)	!:.:.:				
call dsyev(JOBZ, UPLO, n, A, n, EV, WORK , LWORK, info)			!:.:.:				

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function	array2_determinant	(C) result (det)		!:.:.:
call zgetrf(n,n,	A,n,ipiv,info)			!:.:.:
	array2_log_determinant	(C)	result(det)	!:.:.:
call zgetrf(n,n,	A,n,ipiv,info)			!:.:.:
	array2_determinant_d	(C)	result(det)	!:.:.:
call dgetrf(n,n,	A,n,ipiv,info)			!:.:.:
function	array2_log_determinant_d	(C)	result(det)	!:.:.: !:.:.:
call dgetrf(n,n,A,n,ipīv,info)				
function		array2_pfaffian(C)	result(pfaffian)	!:.:.:
	array2_log_pfaffian	(C)	result(pfaffian)	!:.:.:
function	array2_pfaffian2	(C)	result(pfaffian)	!:.:.:
	array2_log_pfaffian2	(C)	result(pfaffian)	!:.:.:
	File: tensorprod_mod.f90			!:.::
module	tensorprod_mod 			. !:
1. 1 3				1
!	:: tensorprod, vecz			· · · · · · · · · · · · · · · · · · ·
interface	tensorprod			!:.:.:
pure function	tensorprod_complex_complex	(X, Y)	result(Z)	!:.:.:
pure function	tensorprod_complex_3	(X1, X2, X3)	result(Z)	!:.:.:
pure function	tensorprod_complex_4	(X1, X2, X3, X4)	result(Z)	!:.:.:
pure function	tensorprod_complex_5	(X1, X2, X3, X4, X5)	result(Z)	!:.:.:
pure function	tensorprod_complex_6	(X1, X2, X3, X4, X5, X6)	result(Z)	!:.:.:
pure function	tensorprod_real_real	(X,Y)	result(Z)	!:.:.:
pure function	tensorprod_real_3	(X1, X2, X3)	result(Z)	!:.:.:
pure function	tensorprod_real_4	(X1, X2, X3, X4)	result(Z)	!:.:.:
pure function	tensorprod_real_5	(X1, X2, X3, X4, X5)	result(Z)	!:.:.:
pure function	tensorprod_real_6	(X1, X2, X3, X4, X5, X6)	result(Z)	!:.:.:
pure function	tensorprod_complex_vec_vec	(u, v)	result(Z)	!:.:.:
pure function	tensorprod_real_vec_vec	(u, v)	result(Z)	!:.:.:
pure function	vec2col_complex	(u)	result(Z)	!:.:.:
pure function	vec2row_complex	(u)	result(Z)	!:.:.:
pure function	vec2col_real	(u)	result(Z)	!:.:.:
pure function	vec2row_real	(u)	result(Z)	!:.:.:
pure function	vectorize_complex	(Z)	result(u)	!:.:.:
pure function	vectorize_real	(Z)	result(u)	!:.:.:
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