Fitting function



for power basis



and



Define the square of distance *d*,



Find the equilibrium position,



where









a=(/1,2,3/)

b=spread(a,1,2)

b(1,1) = 1

b(2,1) = 1

b(1,2) = 2

b(2,2) = 2

b(1,3) = 3

b(2,3) = 3

c=spread(a,2,2)

c(1,1) = 1

c(1,2) = 2

c(1,3) = 3

c(2,1) = 1

c(2,2) = 2

c(2,3) = 3

outerand = spread(a,dim=2,ncopies=size(b)) .and. spread(b,dim=1,ncopies=size(a))

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| c11 | c12 | c13 | c14 | a1 | c16 | c17 | c18 |
| c21 | c22 | c23 | c24 | a2 | c26 | c27 | c28 |
| c31 | c32 | c33 | c34 | a3 | c36 | c37 | c38 |
| c41 | c42 | c43 | c44 | a4 | c46 | c47 | c48 |
| b1 | b2 | b3 | b4 | 1 | b6 | b7 | b8 |
| c61 | c62 | c63 | c64 | a6 | c66 | c67 | c68 |
| c71 | c72 | c73 | c74 | a7 | c76 | c77 | c78 |
| c81 | c82 | c83 | c84 | a8 | c86 | c87 | c88 |

outproduct

spread(a,dim=2,ncopies=size(b))

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a(1,1)=a1 | a(1,2)=a1 | a(1,3)=a1 | a(1,4)=a1 | a(1,5)=a1 | a(1,6)=a1 | a(1,7)=a1 | a(1,8)=a1 |
| a(2,1)=a2 | a(2,2)=a2 | a(2,3)=a2 | a(2,4)=a2 | a(2,5)=a2 | a(2,6)=a2 | a(2,7)=a2 | a(2,8)=a2 |
| a(3,1)=a3 | a(3,2)=a3 | a(3,3)=a3 | a(3,4)=a3 | a(3,5)=a3 | a(3,6)=a3 | a(3,7)=a3 | a(3,8)=a3 |
| a(4,1)=a4 | a(4,2)=a4 | a(4,3)=a4 | a(4,4)=a4 | a(4,5)=a4 | a(4,6)=a4 | a(4,7)=a4 | a(4,8)=a4 |

spread(b,dim=1,ncopies=size(a))

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| b(1,1)=b1 | b(1,2)=b2 | b(1,3)=b3 | b(1,4)=b4 | b(1,5)=b5 | b(1,6)=b6 | b(1,7)=b7 | b(1,8)=b8 |
| b(2,1)=b1 | b(2,2)=b2 | b(2,3)=b3 | b(2,4)=b4 | b(2,5)=b5 | b(2,6)=b6 | b(2,7)=b7 | b(2,8)=b8 |
| b(3,1)=b1 | b(3,2)=b2 | b(3,3)=b3 | b(3,4)=b4 | b(3,5)=b5 | b(3,6)=b6 | b(3,7)=b7 | b(3,8)=b8 |
| b(4,1)=b1 | b(4,2)=b2 | b(4,3)=b3 | b(4,4)=b4 | b(4,5)=b5 | b(4,6)=b6 | b(4,7)=b7 | b(4,8)=b8 |

REBL(SP), DIMENSION(size(b),size(b)) :: outerprod\_r

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a1 b1 | a1 b2 | a1 b3 | a1 b4 | a1 b5 | a1 b6 | a1 b7 | a1 b8 |
| a2 b1 | a2 b2 | a2 b3 | a2 b4 | a2 b5 | a2 b6 | a2 b7 | a2 b8 |
| a3 b1 | a3 b2 | a3 b3 | a3 b4 | a3 b5 | a3 b6 | a3 b7 | a3 b8 |
| a4 b1 | a4 b2 | a4 b3 | a4 b4 | a4 b5 | a4 b6 | a4 b7 | a4 b8 |

=

REBL(SP), DIMENSION(size(b),size(b)) :: outerprod\_r

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a1 b1 | a1 b2 | a1 b3 | a1 b4 | a1 | a1 b6 | a1 b7 | a1 b8 |
| a2 b1 | a2 b2 | a2 b3 | a2 b4 | a2 | a2 b6 | a2 b7 | a2 b8 |
| a3 b1 | a3 b2 | a3 b3 | a3 b4 | a3 | a3 b6 | a3 b7 | a3 b8 |
| a4 b1 | a4 b2 | a4 b3 | a4 b4 | a4 | a4 b6 | a4 b7 | a4 b8 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| c11 | c12 | c13 | c14 | a1 | c16 | c17 | c18 |
| c21 | c22 | c23 | c24 | a2 | c26 | c27 | c28 |
| c31 | c32 | c33 | c34 | a3 | c36 | c37 | c38 |
| c41 | c42 | c43 | c44 | a4 | c46 | c47 | c48 |
| b1 | b2 | b3 | b4 | 1 | b6 | b7 | b8 |
| c61 | c62 | c63 | c64 | a6 | c66 | c67 | c68 |
| c71 | c72 | c73 | c74 | a7 | c76 | c77 | c78 |
| c81 | c82 | c83 | c84 | a8 | c86 | c87 | c88 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a1 b1 | a1 b2 | a1 b3 | a1 b4 | a1 | a1 b6 | a1 b7 | a1 b8 |
| a2 b1 | a2 b2 | a2 b3 | a2 b4 | a2 | a2 b6 | a2 b7 | a2 b8 |
| a3 b1 | a3 b2 | a3 b3 | a3 b4 | a3 | a3 b6 | a3 b7 | a3 b8 |
| a4 b1 | a4 b2 | a4 b3 | a4 b4 | a4 | a4 b6 | a4 b7 | a4 b8 |
| b1 | b2 | b3 | b4 | 1 | b6 | b7 | b8 |
| a6 b1 | a6 b2 | a6 b3 | a6 b4 | a6 | a6 b6 | a6 b7 | a6 b8 |
| a7 b1 | a7 b2 | a7 b3 | a7 b4 | a7 | a7 b6 | a7 b7 | a7 b8 |
| a8 b1 | a3 b2 | a8 b3 | a8 b4 | a8 | a8 b6 | a8 b7 | a8 b8 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| c11 | c12 | c13 | c14 | c15 | c16 | c17 | c18 |
| c21 | c22 | c23 | c24 | c25 | c26 | c27 | c28 |
| c31 | c32 | c33 | c34 | c35 | c36 | c37 | c38 |
| c41 | c42 | c43 | c44 | c45 | c46 | c47 | c48 |
| c51 | c52 | c53 | c54 | 1 | c56 | c57 | c58 |
| c61 | c62 | c63 | c64 | c65 | c66 | c67 | c68 |
| c71 | c72 | c73 | c74 | c75 | c76 | c77 | c78 |
| c81 | c82 | c83 | c84 | c85 | c86 | c87 | c88 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| c15 c51 | c15 c52 | c15 c53 | c15 c54 | c15 | c15 c56 | c15 c57 | c15 c58 |
| c25 c51 | c25 c52 | c25 c53 | c25 c54 | c25 | c25 c56 | c25 c57 | c25 c58 |
| c35 c51 | c35 c52 | c35 c53 | c35 c54 | c35 | c35 c56 | c35 c57 | c35 c58 |
| c45 c51 | c45 c52 | c45 c53 | c45 c54 | c45 | c45 c56 | c45 c57 | c45 c58 |
| c51 | c52 | c53 | c54 | 1 | c56 | c57 | c58 |
| c65 c51 | c65 c52 | c65 c53 | c65 c54 | c65 | c65 c56 | c65 c57 | c65 c58 |
| c75 c51 | c75 c52 | c75 c53 | c75 c54 | c75 | c75 c56 | c75 c57 | c75 c58 |
| c85 c51 | c35 c52 | c85 c53 | c85 c54 | c85 | c85 c56 | c85 c57 | c85 c58 |