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THE UNIVERSITY OF CHICAGO PRESS

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1. The first part of the text discusses the importance of the humanities in a modern world. It highlights how these disciplines provide a deeper understanding of human culture, history, and society, which is essential for a well-rounded education and for addressing complex global challenges.

2. The second part of the text explores the role of the humanities in fostering critical thinking and problem-solving skills. It argues that by studying literature, philosophy, and history, students learn to analyze complex texts, evaluate arguments, and make informed decisions, skills that are highly valued in the workforce and in civic life.

3. The third part of the text discusses the impact of the humanities on personal growth and development. It suggests that these disciplines help individuals understand their own values, beliefs, and emotions, leading to a more self-aware and empathetic society. It also emphasizes the importance of the humanities in promoting cultural diversity and global understanding.

4. The fourth part of the text addresses the economic value of the humanities. It points out that while the humanities may not always have a direct path to high-paying jobs, they provide a strong foundation for many careers in fields like law, education, and public service. Additionally, the creative industries, which are a significant part of the economy, rely heavily on the skills and knowledge developed through the study of the humanities.

5. The fifth part of the text discusses the role of the humanities in shaping public policy and social justice. It argues that a deep understanding of human history and culture is necessary for creating policies that are fair, equitable, and responsive to the needs of all members of society. The humanities provide the tools and perspectives needed to identify and address social inequalities and injustices.

6. The sixth part of the text discusses the importance of the humanities in promoting mental health and well-being. It suggests that the study of literature and art can provide a sense of connection and meaning, which is essential for a healthy and fulfilling life. It also highlights the role of the humanities in providing a safe space for exploring difficult emotions and experiences.

7. The seventh part of the text discusses the role of the humanities in promoting environmental sustainability. It argues that a deep understanding of human history and culture is necessary for addressing the complex challenges of climate change and environmental degradation. The humanities provide the tools and perspectives needed to understand the human impact on the environment and to develop sustainable solutions.

1] \mathbb{R}^n 上の $n \times n$ 行列 A が $\det A = 1$ を満たすとき、 A は \mathbb{R}^n 上の線形変換として、 \mathbb{R}^n を \mathbb{R}^n に写す。このとき、 A は \mathbb{R}^n の体積を 1 倍する。また、 A は \mathbb{R}^n の向きを保持する。これは、 A が \mathbb{R}^n の基底を基底に写すからである。

ここで、 A が \mathbb{R}^n の基底 $\{e_1, \dots, e_n\}$ を基底 $\{f_1, \dots, f_n\}$ に写すとき、 $f_i = \sum_{j=1}^n a_{ij} e_j$ と表すことができる。このとき、 A は f_i を e_i に写す。これは、 A が \mathbb{R}^n の基底を基底に写すからである。また、 A は \mathbb{R}^n の体積を 1 倍する。これは、 A が \mathbb{R}^n の基底を基底に写すからである。

B は \mathbb{R}^n の基底 $\{e_1, \dots, e_n\}$ を基底 $\{f_1, \dots, f_n\}$ に写す。これは、 B が \mathbb{R}^n の基底を基底に写すからである。また、 B は \mathbb{R}^n の体積を 1 倍する。これは、 B が \mathbb{R}^n の基底を基底に写すからである。

D は \mathbb{R}^n の基底 $\{e_1, \dots, e_n\}$ を基底 $\{f_1, \dots, f_n\}$ に写す。これは、 D が \mathbb{R}^n の基底を基底に写すからである。また、 D は \mathbb{R}^n の体積を 1 倍する。これは、 D が \mathbb{R}^n の基底を基底に写すからである。

ここで、 A が \mathbb{R}^n の基底 $\{e_1, \dots, e_n\}$ を基底 $\{f_1, \dots, f_n\}$ に写すとき、 $f_i = \sum_{j=1}^n a_{ij} e_j$ と表すことができる。このとき、 A は f_i を e_i に写す。これは、 A が \mathbb{R}^n の基底を基底に写すからである。



\mathbb{R}^n 上的线性映射 $T: \mathbb{R}^n \rightarrow \mathbb{R}^n$ 满足 $T^2 = T$. 证明 T 是正交投影.

证明: 设 T 的矩阵为 A . 由 $T^2 = T$ 可知 $A^2 = A$. 设 λ 是 A 的特征值, α 是对应的特征向量. 则有 $A\alpha = \lambda\alpha$. 代入 $A^2 = A$ 得 $A(A\alpha) = A\alpha$, 即 $\lambda(A\alpha) = \lambda\alpha$. 由于 $\alpha \neq 0$, 故 $\lambda^2\alpha = \lambda\alpha$. 从而 $\lambda^2 = \lambda$, 解得 $\lambda = 0$ 或 $\lambda = 1$. 因此 A 的特征值只能是 0 或 1. 设 V_0 是特征值 0 对应的特征子空间, V_1 是特征值 1 对应的特征子空间. 显然 $\mathbb{R}^n = V_0 \oplus V_1$. 对任意 $x \in \mathbb{R}^n$, 设 $x = x_0 + x_1$, 其中 $x_0 \in V_0, x_1 \in V_1$. 则 $Ax = Ax_0 + Ax_1 = 0 + x_1 = x_1$. 这说明 A 在 V_0 上为零映射, 在 V_1 上为恒等映射. 因此 A 是正交投影.

设 A, B 是 n 阶实对称矩阵. 证明 A 与 B 可同时对角化的充要条件是 $AB = BA$.

证明: 必要性: 若 A, B 可同时对角化, 则存在正交矩阵 Q 使得 $Q^{-1}AQ = \Lambda, Q^{-1}BQ = \Gamma$, 其中 Λ, Γ 为对角矩阵. 显然 $\Lambda\Gamma = \Gamma\Lambda$, 从而 $AB = BA$.

充分性: 若 $AB = BA$, 则 A 与 B 有公共的特征向量. 设 α_1 是 A 的一个特征向量, λ_1 是对应的特征值. 由 $AB = BA$ 得 $A(B\alpha_1) = B(A\alpha_1) = \lambda_1 B\alpha_1$. 这说明 $B\alpha_1$ 也是 A 的属于 λ_1 的特征向量. 若 $B\alpha_1$ 与 α_1 共线, 则 α_1 也是 B 的特征向量. 若 $B\alpha_1$ 与 α_1 不共线, 则 $\alpha_1, B\alpha_1$ 张成 A 的属于 λ_1 的特征子空间. 重复上述过程, 可找到 A 的属于 λ_1 的特征子空间的一组正交基, 这组基也是 B 的特征向量. 对 A 的所有特征值重复上述过程, 即可找到 \mathbb{R}^n 的一组正交基, 这组基同时是 A 和 B 的特征向量. 因此 A 与 B 可同时对角化.

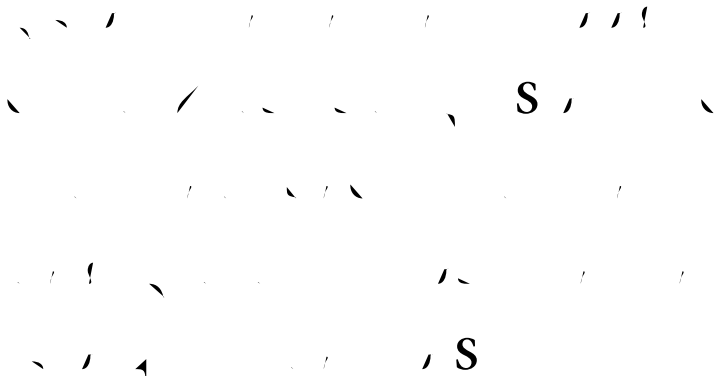
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 $E_{1,2}$...
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 $A_{1,2}$...

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REFERENCES

- A. 2000.
- A. 1992.
- B. H. 1986.
- B. G. A. 1989.
- B. E. 1990.
- C. 1990. D.C..
- C. C. 1988. I. E. G. E. C. 13: A52.
- D. D. E. F. 1998. B. E. F. A.
- F. B. H. D. 1992. C. C. 24: 42, 48 (. F.).
- G. 1995. A. C. I. E. 27: 37, 43 (.).
- G. G. 1992.
- H. B. 1992. C. F. 1990. D. C. 101: 34, 60. 1995. B. C. F. 1990-91 E. D. 40, 48. D. 1989. 1984, 85. E. G. E. E. 87: 30, 43. 1990.

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C : ' D]]], A ' aahe. "
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] ' '] .1975.



JOHN D'ARMS

I have been thinking about you a great deal lately, and wondering how you are getting on. I hope you are well and happy. I have been very busy lately, but I always find time to think of my friends. I would like to see you very much. I hope you will write to me soon. I am always your affectionate friend, John D'Arms.

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- 1 2 3 4 5]] 6 7 8 9 10] 11 12 13 14
-] 1 2 3] 4 5 6] 7 8 9 10 11 12 13 14 15
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2. $\int_0^1 x^2 dx = \frac{1}{3} x^3 \Big|_0^1 = \frac{1}{3} (1^3 - 0^3) = \frac{1}{3}$.

$\int_0^1 x^3 dx = \frac{1}{4} x^4 \Big|_0^1 = \frac{1}{4} (1^4 - 0^4) = \frac{1}{4}$.

$\int_0^1 x^4 dx = \frac{1}{5} x^5 \Big|_0^1 = \frac{1}{5} (1^5 - 0^5) = \frac{1}{5}$.

$\int_0^1 x^5 dx = \frac{1}{6} x^6 \Big|_0^1 = \frac{1}{6} (1^6 - 0^6) = \frac{1}{6}$.

$\int_0^1 x^6 dx = \frac{1}{7} x^7 \Big|_0^1 = \frac{1}{7} (1^7 - 0^7) = \frac{1}{7}$.

SECTION 1. PRELIMINARY RESULTS: COMPARING THE HUMANITIES TO THE ARTS AND SCIENCES

A₁ ... 1998.⁶ B] ...

D] ... F₁ ...

D] ... F₁ ...

D] ... F₁ ...

I₁ ... D] ... F₁ ... A] ...

6. D] ... F₁ ... 1998.

7. I₁ ...

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SECTION 2. PROPERTIES OF DATA RESOURCES LISTED
 IN THE INDEX OF HUMANITIES DATASETS

FUNCTIONAL CLASSIFICATION

B. 12. A. AC. E. (1)
 (2)
 (3)
 (4)

E. F. H.

D. G. C. E. I.

E. I. A. (34-36). H.

G. F. (C.B.) H.

EXHIBIT 1: COUNTS OF DATA RESOURCES BY FUNCTIONAL CLASSIFICATION

type of resource	count
bibliographic materials	35
directories and catalogs	36
research datasets	34
publications and reports	3
total	108

12. A. AC. E. (1)
 (2)
 (3)
 (4)

$E_{\mathbb{R}} \cong H_1(\mathbb{R}^n, \mathbb{R}) \cong \mathbb{R}^n$
 $E_{\mathbb{C}} \cong H_1(\mathbb{C}^n, \mathbb{C}) \cong \mathbb{C}^n$
 $E_{\mathbb{H}} \cong H_1(\mathbb{H}^n, \mathbb{H}) \cong \mathbb{H}^n$

I. $\mathbb{R}^n, \mathbb{C}^n, \mathbb{H}^n$

$B_{\mathbb{R}} \cong \mathbb{R}^n, B_{\mathbb{C}} \cong \mathbb{C}^n, B_{\mathbb{H}} \cong \mathbb{H}^n$

$G_{1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20}$
 ...
 $E_{1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20}$

2. \dots

$D_{1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20}$
 $G_{1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20}$
 $B_{1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20}$
 $D_{1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20}$
 $E_{1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20}$

EXHIBIT 4: COUNTS OF DIRECTORY AND CATALOG DATA RESOURCES BY TYPE

directories and catalogs	count
academic institutions (departments, programs, presses, etc.)	20
funding sources	10
humanities organizations (primarily non-academic)	4
individual humanities practitioners (philosophers)	2
total	36

$E_{1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20}$
 $D_{1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20}$
 $G_{1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20}$
 $E_{1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20}$

EXHIBIT 5: DIRECTORIES AND CATALOGS (36)

\dots
 $A_{1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20}$
 $C_{1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20}$

$G \in CG$ D_{λ} G_{λ} D
 I_{λ} C_{λ} D_{λ}
 G_{λ}
 $A \in G_{\lambda}$ G_{λ} C_{λ}
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 F_{λ} $A D_{\lambda}$ F_{λ}
 G_{λ} A H_{λ} A
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 G_{λ} G_{λ} D_{λ} A H_{λ}
 G_{λ}
 G_{λ} F_{λ} F_{λ}
 G_{λ} G_{λ} H_{λ}

(10)

A_{λ} G_{λ}
 A_{λ} A_{λ}
 C_{λ} 500 C_{λ}
 D_{λ} G_{λ} H_{λ}
 F_{λ} D_{λ}
 F_{λ} G_{λ} I_{λ}
 G_{λ} A
 G_{λ} D_{λ}
 A_{λ} D_{λ} I_{λ}
 C_{λ}

(11)

A_{λ} A_{λ} D_{λ}
 A_{λ} D_{λ}
 D_{λ} H_{λ} G_{λ}
 D_{λ}

(12)

D_{λ} A_{λ} 1998 1999
 E_{λ} D_{λ} 1998 1999

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EXHIBIT 6: COUNTS OF RESEARCH DATA RESOURCES BY TYPE
 RESEARCH DATASETS IN THE INDEX OF HUMANITIES DATASETS

research datasets	count
academic institutions (schools, departments and programs)	5
libraries and museums	7
samples of postsecondary faculty	5
samples of postsecondary students	7
samples of administrative records of postsecondary students	4
samples that include postsecondary students	4
samples of ph.d. recipients	2
total	34

EXHIBIT 7: SORTED BY TYPE

[The following table contains extremely faint and illegible text, likely representing a list of research datasets sorted by type. The text is too light to transcribe accurately.]

ИЕ ... F ...
] ... A ...
A ... F ...] ...] ...

... (4)

AAC ... C ... D ...
A ...] ...
C ... G ... E ...
C ... B ... A ... A ...] ...

... (4)

] ... H ... C] ... 1972
H ... B ...
] ... E ...] ... 1988
] ...] ...] ...

... (2)

H ... D ... (...)
D ...] ...
] ... E] ... D ... (...)

... CD-

A. ... 1993, ... 1991, 92, ... 1982, 1992, ... 2000

... CP ... 9,200 ... I ED ... CD- ... D ... C ... H ... I ED ...

... CE ... I ED

81-1.4 ... (...)1996, 973 ...)8

1983, *Journal of the American Statistical Association*, **78**, 105-110.

• *Journal of the American Statistical Association*, **78**, 105-110.

• *Journal of the American Statistical Association*, **78**, 105-110. (1983, *Journal of the American Statistical Association*, **78**, 105-110.)

LIBRARY DATASETS

... E ... 7), ...

CP ... 53 ... 9,000 ... 1988 ... (98.100 ...)

... AC ... 1979 ... 106 ... G ... C] ... D] ... AC ... I ED ... CD ...

... AC ... 1979 ... 106 ... G ... C] ... D] ... AC ... I ED ... CD ...

AC (A' CII) ...

AC ... I ED ...

A ... 1993 ... 12,000 ... A ... 121 ... A ...

A ... 121 ... A ... I ED ...

A ... 1908 ...

A ... 1988 ... 1966 ... 3,400 ... 87 ... 93 ... D ...

• [1] CE . . .

D[1] [1] . . .
[1] [1] . . .
H . . .
[1] [1] CE . . .
[1] [1] [1] 1994] . . .
1996. . .
[1] [1] [1] . . .
[1] [1] [1] . . .
[1] [1] [1] 2000 . . . 2002 [1] . . .

MUSEUM DATASETS

• $\mu, \sigma, \tau, \delta, \epsilon, \theta$

] 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100.

\mathbb{R}^n 上的线性映射 $T: \mathbb{R}^n \rightarrow \mathbb{R}^n$ 的矩阵表示为 A ，即 $T(x) = Ax$ 。若 A 满足 $A^2 = A$ ，则称 A 为幂等矩阵。此时 T 称为投影映射。

设 A 为 $n \times n$ 实矩阵，且 $A^2 = A$ 。则 A 的特征值只能是 0 或 1。这是因为若 λ 是 A 的特征值， v 是对应的特征向量，则有 $A^2 v = A(Av) = A(\lambda v) = \lambda(Av) = \lambda(\lambda v) = \lambda^2 v$ 。同时，由 $A^2 = A$ 可知 $A^2 v = Av = \lambda v$ 。因此 $\lambda^2 v = \lambda v$ ，即 $\lambda^2 = \lambda$ ，解得 $\lambda = 0$ 或 $\lambda = 1$ 。

进一步，若 $\lambda = 1$ ，则 $Av = v$ ，即 v 属于 A 的像空间 $\text{Im}(A)$ 。若 $\lambda = 0$ ，则 $Av = 0$ ，即 v 属于 A 的核空间 $\text{Ker}(A)$ 。因此， \mathbb{R}^n 可以分解为 $\text{Im}(A)$ 和 $\text{Ker}(A)$ 的直和。

在适当的基下， A 的矩阵表示为分块对角阵 $\begin{pmatrix} I_r & 0 \\ 0 & 0 \end{pmatrix}$ ，其中 I_r 是 $r \times r$ 的单位矩阵， $r = \text{rank}(A)$ 。

19

Mathematical Analysis

$H_x = \frac{1}{2} x^T A x$ 是二次型函数，其中 A 为实对称矩阵。其 Hessian 矩阵为 $H_x = A$ 。若 A 正定，则 H_x 正定， H_x^{-1} 存在。

设 A 为 $n \times n$ 实对称矩阵，其特征值为 $\lambda_1, \lambda_2, \dots, \lambda_n$ ，对应的特征向量为 v_1, v_2, \dots, v_n 。则 A 可正交对角化，即存在正交矩阵 Q 使得 $A = Q \Lambda Q^T$ ，其中 $\Lambda = \text{diag}(\lambda_1, \lambda_2, \dots, \lambda_n)$ 。

若 A 正定，则所有特征值 $\lambda_i > 0$ 。此时 $A^{-1} = Q \Lambda^{-1} Q^T$ ，其中 $\Lambda^{-1} = \text{diag}(1/\lambda_1, 1/\lambda_2, \dots, 1/\lambda_n)$ 。

考虑二次型 $f(x) = \frac{1}{2} x^T A x$ ，其中 A 为实对称矩阵。若 A 正定，则 $f(x)$ 在 $x=0$ 处取得唯一极小值。

设 A 为 $n \times n$ 实对称矩阵，且 $A^2 = A$ 。则 A 的特征值为 0 或 1。若 A 正定，则 $A = I_n$ 。

若 A 不正定，则 A 的秩 $r < n$ 。此时 A 的像空间 $\text{Im}(A)$ 和核空间 $\text{Ker}(A)$ 的维数之和为 n 。

A 为 $n \times n$ 实对称矩阵，其特征值为 $\lambda_1, \lambda_2, \dots, \lambda_n$ 。则 A 的行列式为 $\det(A) = \lambda_1 \lambda_2 \dots \lambda_n$ 。

若 A 正定，则 $\det(A) > 0$ 。若 A 不正定，则 $\det(A)$ 的符号取决于负特征值的个数。

设 A 为 $n \times n$ 实对称矩阵，且 $A^2 = A$ 。则 A 的迹 $\text{tr}(A)$ 等于 A 的秩 r 。这是因为 A 的特征值为 r 个 1 和 $n-r$ 个 0。

设 A 为 $n \times n$ 实对称矩阵，且 $A^2 = A$ 。则 A 的谱半径 $\rho(A) = 1$ 。

若 A 正定，则 A 的谱半径 $\rho(A) = \lambda_{\max}(A) > 0$ 。

设 A 为 $n \times n$ 实对称矩阵，且 $A^2 = A$ 。则 A 的逆矩阵 A^{-1} 存在当且仅当 A 正定。

若 A 不正定，则 A 不可逆。

B&B] ... 1992, 93] ... A' :93] ... (A=10,080) ... B&B] ... B&B] ... Ca ... Fa ... CD- ... 21 ... CE .

B&B] ... He ... 10,000 ... 1,000] ... 230 ... E ... A ... 190 ... H ... 125 ... 35 ... 50] ... (1997) ... 25 ... 2,500 ... 500] ... Ca ... B&B] ... 2000 B&B] ... E ... CE ... A'] ... B&B] ... A' : ... B&B] ... A' :93] ... B' ... 1990 ... A'] ... Fa ...

B&B] ... (B') ... CE] ... B&B] ... B' ... A' : ... B&B] ... A' :93] ... 1990 ... A'] ... Fa ... 21. A ... CE ... CD- ... D] ... A] ... B&B] ... A ... D] ... A] ...

••••• B :90••••• 1992] 1994. A. B
*] •••••]•••••]••••• A 1996. 97•••••]•••••

A is a \mathbb{Z} -module. Let H be the subgroup of A generated by $\{2x, 3y, 4z\}$. Then A/H is a \mathbb{Z} -module. We want to find the structure of A/H .

Consider the map $\phi: \mathbb{Z} \times \mathbb{Z} \times \mathbb{Z} \rightarrow \mathbb{Z} \times \mathbb{Z} \times \mathbb{Z}$ defined by $\phi(x, y, z) = (2x, 3y, 4z)$. The image of ϕ is H . The quotient A/H is isomorphic to $(\mathbb{Z} \times \mathbb{Z} \times \mathbb{Z}) / \text{Im}(\phi)$.

The Smith Normal Form of the matrix $\begin{pmatrix} 2 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 4 \end{pmatrix}$ is $\begin{pmatrix} 1 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 4 \end{pmatrix}$. Therefore, $A/H \cong \mathbb{Z} \oplus \mathbb{Z}/3\mathbb{Z} \oplus \mathbb{Z}/4\mathbb{Z}$.

The order of A/H is $3 \cdot 4 = 12$. The elements of A/H are $\{0, x, 2x, \dots, 11x\}$. The element x has order 12.

The order of A/H is 12 . The elements of A/H are $\{0, x, 2x, \dots, 11x\}$. The element x has order 12.

1997, 98)]... 1997, 98)]... IIE ... (:// ... 9798.) .
 ... 248,000 ... 1997, 98) ...
 ... 481,000 ...
 ... 120 ...
 ...

... G ... E ...
 ... L ...
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 ...
 ...

'A']... 1987, 1990, 1993;] 1996;] ... 2000. A ... 900 ... 1,100 ...
 ... 50,000 ... 60,000 ... 'A' ...
 E] ... 'A'] ...] ...
 ...] ...] ...] ...
 ... E] ...] ...] ...] ...
 ...] ...] ...] ...] ...

(B&B) 1993 11,000 A 2000 90

A 50,000 5,200 30,000 3,100 A 1,920 A 1,920 A HE I

CI A HE I

CI A HE I

[A] $\in \mathbb{R}^{n \times n}$ is a symmetric matrix. Let $\lambda_1, \lambda_2, \dots, \lambda_n$ be the eigenvalues of A . We know that $\lambda_i = \lambda_i^T$. For any vector $x \in \mathbb{R}^n$, we can write x as a linear combination of the eigenvectors of A . Let v_1, v_2, \dots, v_n be the eigenvectors corresponding to $\lambda_1, \lambda_2, \dots, \lambda_n$ respectively. Then $x = c_1 v_1 + c_2 v_2 + \dots + c_n v_n$ for some scalars c_1, c_2, \dots, c_n .

Let λ_1 be the largest eigenvalue of A . We claim that $\lambda_1 \geq \frac{1}{n} \text{tr}(A)$. To see this, note that $\text{tr}(A) = \lambda_1 + \lambda_2 + \dots + \lambda_n$. Since $\lambda_i \leq \lambda_1$ for all i , we have $\lambda_1 + \lambda_2 + \dots + \lambda_n \leq \lambda_1 + \lambda_1 + \dots + \lambda_1 = n \lambda_1$. Dividing both sides by n gives $\frac{\text{tr}(A)}{n} \leq \lambda_1$.

Now, let $x = \frac{1}{\sqrt{n}}(v_1 + v_2 + \dots + v_n)$. Then $\|x\| = 1$ and $Ax = \frac{1}{\sqrt{n}}(\lambda_1 v_1 + \lambda_2 v_2 + \dots + \lambda_n v_n)$. The Rayleigh quotient of A at x is $\frac{x^T A x}{x^T x} = \frac{1}{n}(\lambda_1 + \lambda_2 + \dots + \lambda_n) = \frac{\text{tr}(A)}{n}$. By the above claim, we have $\frac{\text{tr}(A)}{n} \leq \lambda_1$.

Conversely, let λ_1 be the largest eigenvalue of A . We claim that $\lambda_1 \leq \text{tr}(A)$. To see this, note that $\lambda_1 \leq \lambda_1 + \lambda_2 + \dots + \lambda_n = \text{tr}(A)$.

Combining these two results, we have $\frac{\text{tr}(A)}{n} \leq \lambda_1 \leq \text{tr}(A)$.

• • • • •] 1990
A, B, C, G, H, E (I HE) 42,007
1991 100 1360
81 42,000 Au 27 A
I HE F 1995 H F 2000

A, B, C, G, H, E (I HE) 1991 100 1360 81 42,000 Au 27 A I HE F 1995 H F 2000

A, B, C, G, H, E (I HE) 1991 100 1360 81 42,000 Au 27 A I HE F 1995 H F 2000

(I).

... .. CE,]
... ..] ...] ...] ...] ...] ...] ...] ...] ...] ...] ...] ...] ...] ...] ...]
... .. 28 (E ' :88), (HP &B) .

34
]
 E₁ H₁ E₂ D₀ ED]
 H₁ E₁ D₀ ED]
 D₀ ED] 1958.
 E₁ C₁ C₁ ED]
 A] ED]
 I 1997, ED]
 G₂ (C), ED]
 ED]

ED]
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 B₁ ED]
 ED]
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]

ED]
 C₁ C₁]
 E / (108804, 80077, 108242 o α, 800179 o o B 8.7₁ IHD

...] 36
 ...
 ... 1977 ...
 ... ED ... & E'D] ...
 ... 1995. EH] ...
 ... 1990.] ...
 ... 1995.

...] ...
 ... 50.0] ...
 ... 76] ...
 ... A ...] ...
 ... 75] ...
 ... D ...] ...
 ... E ...] ...
 ...] ...
 ... 9,000 ...
 ... 1977 ... 1995; ...

A ...] ...
 ... 87 ... (1993) ...] ... 54 ... (1989). ...
 ... ED ...] ...
 ... H ...] ...

...

...] ...
 ...] ...
 ... G ... E ...] ...
 ...] ...
 ... 56] H ... C ...
 ...] ... 1962] ...
 ... 1977, 78, 1983, 84] ... 1985, 86, ...
 ...] ...
 ...] ... 60 ...] ...
 ...] ... 400] ...
 ... B ...] ...
 ...] ... G ... E ... A ...] ...

36.] ... 1995 ...] ...
 ... H ... D ...] ... 1995 ...
 ... D ...] ...

$\alpha \in [0, 1]$ is a parameter that controls the trade-off between the two objectives. When $\alpha = 0$, the algorithm focuses on minimizing the number of clusters, while when $\alpha = 1$, it focuses on maximizing the number of clusters. The parameter α is set to 0.5 in this study. The algorithm is implemented in Python and runs on a Windows 10 operating system. The results are compared with those of the existing datasets.

H₁ : 0 ≤ α ≤ 1, β = 1 - α, γ = α + β = 1. H₀ : α > 1, β < 0, γ = α + β = 1. H₁ : α < 0, β > 1, γ = α + β = 1. H₀ : α = 1, β = 0, γ = 1. H₁ : α < 1, β > 0, γ = 1. H₀ : α = 0, β = 1, γ = 1. H₁ : α > 0, β < 1, γ = 1. H₀ : α = 0, β = 0, γ = 0. H₁ : α > 0, β > 0, γ > 0.

In the case of H_1 , the test statistic T_n is defined as $T_n = \frac{1}{n} \sum_{i=1}^n \log \frac{f(X_i)}{g(X_i)}$ where f and g are the densities of the two distributions. The test is consistent for H_1 against H_0 if $T_n \rightarrow \infty$ as $n \rightarrow \infty$.

- H_1 : $\alpha > 1, \beta < 0, \gamma = 1$
- H_1 : $\alpha < 0, \beta > 1, \gamma = 1$
- H_0 : $\alpha = 1, \beta = 0, \gamma = 1$
- H_0 : $\alpha = 0, \beta = 1, \gamma = 1$
- H_0 : $\alpha = 0, \beta = 0, \gamma = 0$
- H_1 : $\alpha > 0, \beta > 0, \gamma > 0$

2. β - γ test for H_1 against H_0 : $\beta = 0, \gamma = 1$

The β - γ test is defined as $T_n = \frac{1}{n} \sum_{i=1}^n \log \frac{f(X_i)}{g(X_i)}$ where f and g are the densities of the two distributions. The test is consistent for H_1 against H_0 if $T_n \rightarrow \infty$ as $n \rightarrow \infty$.

37. D'Agostino, R. B. (1986). A test for normality: The W-S test. *Journal of the Royal Statistical Society*, 48, 330-334.

3. \mathbb{Z}^2 上的同态

3.1. \mathbb{Z}^2 上的同态 $f: \mathbb{Z}^2 \rightarrow \mathbb{Z}^2$ 的核 $\ker f$ 的秩是多少?
为什么?

解: 设 f 的矩阵为 $A = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$. 则 $\ker f$ 是 \mathbb{Z}^2 的子群. 由 Smith 标准形可知, A 可化为 $\begin{pmatrix} d_1 & 0 \\ 0 & d_2 \end{pmatrix}$, 其中 $d_1, d_2 \in \mathbb{Z}$. 于是 $\ker f$ 的秩为 $2 - \text{rank}(A)$. 若 $\det A \neq 0$, 则 $\ker f = \{0\}$, 秩为 0. 若 $\det A = 0$, 则 $\ker f$ 的秩为 1.

3.2. 设 $f: \mathbb{Z}^2 \rightarrow \mathbb{Z}^2$ 是同态, $f(x, y) = (2x + 3y, x + 2y)$. 求 $\ker f$ 的秩. 为什么?

- $\ker f$ 的秩为 1.
- $\ker f$ 的基为 $\{(3, -2)\}$.
- $\ker f$ 的秩为 1, 因为 $\det A = 5 \neq 0$.
- $\ker f$ 的秩为 1.

3.3. 设 $f: \mathbb{Z}^2 \rightarrow \mathbb{Z}^2$ 是同态, $f(x, y) = (2x + 3y, x + 2y)$. 求 $\text{Im} f$ 的秩. 为什么?

4. \mathbb{Z}^2 上的同态

4.1. \mathbb{Z}^2 上的同态 $f: \mathbb{Z}^2 \rightarrow \mathbb{Z}^2$ 的核 $\ker f$ 的秩是多少?
为什么?

解: 设 f 的矩阵为 $A = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$. 则 $\ker f$ 是 \mathbb{Z}^2 的子群. 由 Smith 标准形可知, A 可化为 $\begin{pmatrix} d_1 & 0 \\ 0 & d_2 \end{pmatrix}$, 其中 $d_1, d_2 \in \mathbb{Z}$. 于是 $\ker f$ 的秩为 $2 - \text{rank}(A)$. 若 $\det A \neq 0$, 则 $\ker f = \{0\}$, 秩为 0. 若 $\det A = 0$, 则 $\ker f$ 的秩为 1.

4. ...
...?

...
... 2000 ... (... 3.5) ... BA] ...
A ... 1995. 96 ...
... (...) ...
...] ...

4. ...
...?

... D ...
... (D) ...
1977. ... 1995 (...) ...
... D ... E ...
...] ... 3.6 ... 2000 ...
... 1995] ... 1997 ...
...] ... 3.9 ...
... D ...

4. ...
...?

...] ...

1. The first part of the text discusses the importance of the humanities in education. It argues that a well-rounded education should include the study of literature, history, and the arts, as these disciplines provide students with a deeper understanding of the human condition and the world around them.

2. The second part of the text explores the role of the humanities in the workplace. It suggests that the skills developed through the study of the humanities, such as critical thinking, communication, and problem-solving, are highly valued by employers and can give students a competitive edge in the job market.

3. The third part of the text discusses the challenges facing the humanities in the current educational landscape. It notes that the humanities are often underfunded and underappreciated, and that there is a growing emphasis on STEM fields. However, it also highlights the ongoing efforts to reform and revitalize the humanities, including the development of new courses and programs that make the study of the humanities more relevant and engaging for students.

4. The fourth part of the text discusses the benefits of the humanities for society as a whole. It argues that the humanities help to foster a sense of community and shared values, and that they play a crucial role in shaping the cultural and intellectual life of a nation.

5. The fifth part of the text discusses the role of the humanities in the digital age. It suggests that the humanities can help students navigate the complexities of the digital world and develop the critical thinking skills needed to discern truth from misinformation.

6. The sixth part of the text discusses the role of the humanities in the global context. It argues that the humanities provide a common language and shared values that can help bridge cultural divides and promote understanding and cooperation between nations.

7. The seventh part of the text discusses the role of the humanities in the future of education. It suggests that the humanities should be at the center of any educational system, as they provide the foundation for a well-rounded and meaningful education.

A. . . . A.

. . . .] E H]

AAC C D]

AA / AG D E

AA G]

AC]

A A G G] C]

A A]

A

A]

A A D]

A]]

A]

A] - H]

A] A D

A] C]

A] F]

A] D

A] G]

A]] H] C

A] C

A A

A] H] C I

A] A] D

A I A]

A] A]

B]] B]

B]]

B] H A

CG / G E G] E

C] G E]

C B B

C B : A] A]

C C C]

C] E]

C] 500 - C]

C C

D] A]]

D] E]

D] A] 1998, 1999

D] A]]

A. . . . C.

... .. E. . . . G. . . .

B. . . . A. . . . (35)

... .. (I)

AA. . . . Q. . . .

A. . . . A

C. . . . C. . . .

D. . . . A. . . .

D. . . . A. . . . I. . . .

E. . . . I. . . . G. . . . (E IC)

E. . . . A. . . . I. . . .

F. . . . F. . . .

C A CD. . . .

... ..

...

C C Q. . . .

I

... .. C. . . . I. . . .

... .. D. . . .

... ..

... .. (I')

AD. . . .

AI. . . . B. . . .

A A D. . . .

A H. . . .

A

A. . . . H. . . . C. . . . I. . . .

A. . . . I. . . . A. . . .

B. . . . H. . . . A.

E. . . . I. . . .

G. . . . E. . . . H. . . . I. . . . Q. . . .

H. . . . A. . . .

... .. B. . . . A. . . .

... .. C. . . .

... .. A. . . . G. . . .

... .. A. . . .

... .. A. . . .

... .. I. . . .

I A. . . .

... .. A. . . .

f, g, h, \dots

$f, g, h, \dots (20)$

$A \subseteq B, C \subseteq D, \dots$

$C \subseteq B, B \subseteq A$

$G \subseteq E/CG, D \subseteq G, \dots$

I, \dots

$C \subseteq D, \dots$

G, \dots

$A \subseteq G, G \subseteq C, \dots$

$D \subseteq A, \dots$

$D \subseteq D, \dots$

$A \subseteq D$

$D \subseteq G, \dots$

$D \subseteq H, D \subseteq D, \dots$

$D \subseteq G, \dots$

$D \subseteq D, \dots$

$F \subseteq A, \dots$

$D \subseteq F$

የሥነ ግንዛቤ ስልጠና (2)

D₂ ማለት ሲሆን A ማለት ግን አሁን ያለውን ነው። 1998-1999 ዓ.ም. ለሥነ ግንዛቤ ስልጠና ይገባል።

የሥነ ግንዛቤ ስልጠና (4)

- AAC ማለት ሲሆን D₁ ማለት ሲሆን
- AA/AG ማለት ሲሆን D₂ ማለት ሲሆን E ማለት ሲሆን
- A] ማለት ሲሆን ለሥነ ግንዛቤ
- AC ማለት ሲሆን ለሥነ ግንዛቤ
- A] ማለት ሲሆን ለሥነ ግንዛቤ
- A ማለት ሲሆን ለሥነ ግንዛቤ
- A ማለት ሲሆን ለሥነ ግንዛቤ
- A ማለት ሲሆን ለሥነ ግንዛቤ
- A ማለት ሲሆን ለሥነ ግንዛቤ
- B] ማለት ሲሆን ለሥነ ግንዛቤ
- B ማለት ሲሆን ለሥነ ግንዛቤ
- CG/G E ማለት ሲሆን G] ማለት ሲሆን E ማለት ሲሆን
- C] ማለት ሲሆን ለሥነ ግንዛቤ
- C ማለት ሲሆን ለሥነ ግንዛቤ
- C ማለት ሲሆን ለሥነ ግንዛቤ
- H₂ ማለት ሲሆን ለሥነ ግንዛቤ
- H₁ ማለት ሲሆን ለሥነ ግንዛቤ
- E ማለት ሲሆን ለሥነ ግንዛቤ
- IIE ማለት ሲሆን ለሥነ ግንዛቤ
- I ED ማለት ሲሆን ለሥነ ግንዛቤ

- ለሥነ ግንዛቤ ስልጠና ለሥነ ግንዛቤ
- A ማለት ሲሆን ለሥነ ግንዛቤ
- A ማለት ሲሆን ለሥነ ግንዛቤ
-] ማለት ሲሆን ለሥነ ግንዛቤ
-] ማለት ሲሆን ለሥነ ግንዛቤ
-] ማለት ሲሆን ለሥነ ግንዛቤ
-] ማለት ሲሆን ለሥነ ግንዛቤ
-] ማለት ሲሆን ለሥነ ግንዛቤ
-] ማለት ሲሆን ለሥነ ግንዛቤ
-] ማለት ሲሆን ለሥነ ግንዛቤ
-] ማለት ሲሆን ለሥነ ግንዛቤ
-] ማለት ሲሆን ለሥነ ግንዛቤ
-] ማለት ሲሆን ለሥነ ግንዛቤ
-] ማለት ሲሆን ለሥነ ግንዛቤ
-] ማለት ሲሆን ለሥነ ግንዛቤ
-] ማለት ሲሆን ለሥነ ግንዛቤ

የሥነ ግንዛቤ ስልጠና (3)

A ማለት ሲሆን ለሥነ ግንዛቤ
 C ማለት ሲሆን ለሥነ ግንዛቤ
 D ማለት ሲሆን ለሥነ ግንዛቤ

A. . . . D.

] . E. . . . D.] D. . . .
=]

. . .] . C. .
. . . C. . .
. . . DA .
. . . F] .
. . . H] .
A . . .
. . .] .
F] . . .
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. . .
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. . .
. . .] .
. . .] .

C. . . .
] . . . H] . . . G .
A . . . C. . . .
. . .] . . . A . . .
] . . . H] . . . A . . .
A . . . H] . . . A . . .
C. . . .
. . . C. . .
. . . G] . . . B . . .
. . . .
. . . .
] . . . I . . .
] . . . E . . . H] . . .
A . . . C. . . .

. . .
. . . B . . .

A . . . A] . . . A . . .

S

... E ... 1987 ...
... A] ... D] ...
D ...

F] ... E ... C ...
B ... A ... A] ... & ... H ...
A] ... D] ... D ... H ...
C ...

... DA ... A ... C ...
... A] ... H ...
... A] ...

... F] ... E ... D ...
A ... A] ...
] ...

G ... C ... E] ...
... H ...
... A] ...
... A] ...
...] ...

