

Oefeningen Toegepaste Algebra en Differentiaalvergelijkingen

Relevante oefeningen om de leerstof te verwerken en in te oefenen

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Referentie/Handboek:

David Lay et al. (2016). Linear Algebra and its Applications. 5th edition, Pearson.

Gebruikte afkorting: t.e.m. = tot en met.

1 Linear equations in Linear Algebra

- 1.1. Systems of linear equations: oef. 15 t.e.m. 28.
- 1.2. Row reduction and echelon forms: oef. 1 t.e.m. 14 en 17 t.e.m. 31.
- 1.3. Vector equations: oef. 11 t.e.m. 26 en 32 t.e.m. 34.
- 1.4. The matrix equation $Ax = b$: oef. 5 t.e.m. 36.
- 1.5. Solution sets of linear systems: oef. 7 t.e.m. 40.
- 1.7. Linear independence: oef. 9 t.e.m. 40.
- 1.8. Introduction to linear transformations: oef. 1 t.e.m. 12 en 21 t.e.m. 40.
- 1.9. The matrix of a linear transformation: oef. 15 t.e.m. 22.

Supplementary exercises: oef. 1 en 2, 4 t.e.m. 20.

2 Matrix Algebra

- 2.1. Matrix operations:** oef. 1 t.e.m. 34.
- 2.2. The inverse of a matrix:** oef. 1 t.e.m. 26.
- 2.3. Characterizations of invertible matrices:** oef. 1 t.e.m. 28.
- 2.4. Partitioned matrices:** oef. 1 t.e.m. 14.
- 2.5. Matrix factorizations:** oef. 1 t.e.m. 15 en 18 t.e.m. 21.
- 2.8. Subspaces of \mathbb{R}^n :** oef. 5 t.e.m. 36.
- 2.9. Dimension and rank:** oef. 9 t.e.m. 26.

Supplementary exercises: oef. 1 t.e.m. 10 en 12 t.e.m. 13.

3 Determinants

- 3.1. Introduction to determinants:** oef. 1 t.e.m. 14 en 25 t.e.m. 40.
- 3.2. Properties of determinants:** oef. 21 t.e.m. 44.
- 3.3. Cramer's rule, Volume and Linear Transformations:** oef. 19 t.e.m. 30.

Supplementary exercises: oef. 1 t.e.m. 4 en 14 t.e.m. 15.

4 Vector spaces

- 4.1. Vector spaces and subspaces:** oef. 1 t.e.m. 24 en 31 t.e.m. 34.
- 4.2. Null spaces, Column spaces and Linear transformations:**
oef. 1 t.e.m. 33 en 35 t.e.m. 36.
- 4.3. Linearly independent sets and bases:**
oef. 1 t.e.m. 16, 19 t.e.m. 27 en 33 t.e.m. 35.
- 4.4. Coordinate systems:** oef. 1 t.e.m. 22 en 27 t.e.m. 32.
- 4.5. The dimension of a vector space:** oef. 1 t.e.m. 25, 29 en 30.
- 4.6. Rank:** oef. 1 t.e.m. 30.
- 4.7. Change of basis:** oef. 7 t.e.m. 10, 13 en 14.

Supplementary exercises: oef. 1 t.e.m. 3 en 12 t.e.m. 15.

5 Eigenvalues and eigenvectors

- 5.1. Eigenvectors and eigenvalues: oef. 7 t.e.m. 30.
- 5.2. The characteristic equation: oef. 1 t.e.m. 22 en 26.
- 5.3. Diagonalization: oef. 7 t.e.m. 32.
- 5.4. Eigenvectors and linear transformations: oef. 3 t.e.m. 26.
- 5.5. Complex eigenvalues: oef. 1 t.e.m. 6.

Supplementary exercises: oef. 1 t.e.m. 3, 13, 14 en 17.

6 Orthogonality and least squares

- 6.1. Inner product, length and orthogonality: oef. 15 t.e.m. 20, 27, 28, 29, 31.
- 6.2. Orthogonal sets: oef. 1 t.e.m. 30.
- 6.3. Orthogonal projections: oef. 3 t.e.m. 24.
- 6.4. The Gram-Schmidt process: oef. 1 t.e.m. 20.
- 6.5. Least squares problems: oef. 1 t.e.m. 22.
- 6.7. Inner product spaces: oef. 3 t.e.m. 8 en 21 t.e.m. 24.

Supplementary exercises: oef. 1, 4, 5 en 6.

7 Symmetric matrices and quadratic forms

- 7.1. Diagonalization of symmetric matrices: oef. 13 t.e.m. 32, 35 en 36.
- 7.2. Quadratic forms: oef. 3 t.e.m. 5, 9 t.e.m. 14 en 23 t.e.m. 27.

Supplementary exercises: oef. 2 en 5.