



2.3 Vector operators

Douglas Wilhelm Harder, LEL, M.Math.

dwharder@uwaterloo.ca

dwharder@gmail.com





Introduction

- In this topic, we will
 - Revisit field operations
 - Introduce vector operations
 - Describe the notation of $\mathbf{F}^n$





Vector operations

- In a field, we had two operations:
 - Addition
 - Multiplication
- For vectors, we will introduce two operations:
 - Scalar multiplication
 - Vector addition
- Important: while we could define vector multiplication,
 - there are no significant consequences that can be deduced
 - The properties of linear algebra depend on scalar multiplication and vector addition only





Vector operations

- We have looked at real and complex vectors
 - Both the real numbers and the complex numbers are fields
- If we don't care if we are using real or complex vectors, we will use the notation $\mathbf{F}^n$ where it is understood that the field $\mathbf{F}$ can be either $\mathbf{R}$ or $\mathbf{C}$
- The entries of the corresponding field are also called *scalars*
- We will be:
 - Adding two vectors
 - Multiplying a vector by a scalar or entry in the corresponding field





Summary

- Following this topic, you now
 - Have been introduced to the operations we will focus on next
 - Vector addition and scalar multiplication
 - Know we will use $\mathbf{F}^n$ when we don't care if the vectors are real or complex
 - Understand that “scalar” is just another term for an entry in the corresponding field





References

- [1] https://en.wikipedia.org/wiki/Linear_algebra





Acknowledgments

None so far.



Colophon

These slides were prepared using the Cambria typeface. Mathematical equations use Times New Roman, and source code is presented using Consolas.

The photographs of flowers and a monarch butter appearing on the title slide and accenting the top of each other slide were taken at the Royal Botanical Gardens in October of 2017 by Douglas Wilhelm Harder. Please see

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for more information.





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