

Homework 1 Supplement

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February 6, 2018

1 Linear Algebra

1.1 Vector Spaces

Definition 1. A vector space over a field \mathbb{F} is a set V with two operations that satisfy the following axioms:

1. **Closure under addition and scalar multiplication** - $\mathbf{u} + \mathbf{v} \in V$ for $\mathbf{u}, \mathbf{v} \in V$
2. **Commutativity of Addition** - $\mathbf{u} + \mathbf{v} = \mathbf{v} + \mathbf{u}, \forall \mathbf{u}, \mathbf{v} \in V$
3. **Associativity of Addition** - $\mathbf{u} + (\mathbf{v} + \mathbf{w}) = (\mathbf{u} + \mathbf{v}) + \mathbf{w}, \forall \mathbf{u}, \mathbf{v}, \mathbf{w} \in V$
4. **Additive Identity** - There exists an element $\mathbf{0} \in V$ such that $\mathbf{v} + \mathbf{0} = \mathbf{v} \forall \mathbf{v} \in V$
5. **Additive Inverse** - For every $\mathbf{v} \in V$, there exists an element $(-\mathbf{v}) \in V$ such that $\mathbf{v} + (-\mathbf{v}) = \mathbf{0}$
6. **Scalar Identity** - $1\mathbf{v} = \mathbf{v}$ where 1 is the multiplicative identity in \mathbb{F}
7. **Distributivity 1** - $a(b\mathbf{v}) = (ab)\mathbf{v}$
8. **Distributivity 2** - $a(\mathbf{u} + \mathbf{v}) = a\mathbf{u} + a\mathbf{v}$
9. **Distributivity 3** - $(a + b)\mathbf{v} = a\mathbf{v} + b\mathbf{v}$

For the purposes of demonstrating ability to create boxes and mathematical formulas (aside from the ones shown above), here is a general formula for *Picard Iterations*:

$$y(x) = y_0 + \int_{x_0}^x f(s, y(s)) ds$$

Now in an effort to demonstrate my ability to put pictures in my L^AT_EX document, here is a picture of my Spring 2018 class schedule.

	Monday	Tuesday	Wednesday	Thursday	Friday
8am	Statistics-133		Statistics-133		Statistics-133
8:15	Dwinelle 155		Dwinelle 155		Dwinelle 155
8:30	Gaston Sanchez		Gaston Sanchez		Gaston Sanchez
8:45					
9am	Statistics-135		Statistics-135		Statistics-135
9:15	Evans 10		Evans 10		Evans 10
9:30	Fletcher Ibsen		Fletcher Ibsen		Fletcher Ibsen
9:45					
10am	Physical		Physical		
10:1	Education-3		Education-3		
10:3	RSF		RSF		
10:4					
11am	Physical		Physical		
11:1	Education-2		Education-2		
11:3	RSF		RSF		
11:4					
12pm					
12:15					
12:30		Statistics-150		Statistics-150	
12:45		Latimer 120		Latimer 120	
1pm		Brett Kolesnik		Brett Kolesnik	
1:15					
1:30					
1:45					
2pm	Mathematics-104		Mathematics-104	Statistics-133	Mathematics-104
2:15	Cory 247		Cory 247	Evans 340	Cory 247
2:30				Da Xu	
2:45					Statistics-135
3pm					Evans 334
3:15					
3:30					
3:45					
4pm					
4:15					
4:30					
4:45					
5pm					
5:15					
5:30					
5:45					
6pm					
6:15					
6:30					
6:45					
7pm		Information-98			
7:15		Barrows 126			
7:30		Paul Laskowski			
7:45					
8pm					
8:15					
8:30					
8:45					
9pm					
9:15					
9:30					
9:45					