**Algebraic Properties of Matrix-Vector Product**

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| **Name** | **Description** | **Terms** |
| **Distributive Property** of Matrix-Vector Multiplication |  | * – Matrix * – Vectors in * – Real scalars in |
| **Commutativity** of Scalar Multiplication |  |

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| **Distributive Property of Matrix-Vector Multiplication**   1. Suppose is **any matrix**, andare **any real vector in**  in the form:   and   1. By the **definition of vector addition**:      1. By the **definition of matrix-vector product**: 2. By the **distributive property of vector scalar multiplication**: 3. By the **definition of matrix-vector product**: 4. By the **definition of and** :   **(QED)** | **Proof of the Inverse Property of Vector Addition**   1. Suppose is **any matrix**, is **any scalar in** , is **any real vector in**  in the form:   and   1. By the **definition of vector addition**:      1. By the **definition of matrix-vector product**: 2. By the **distributive property of real-number multiplication**: 3. By the **definition of matrix-vector product**: 4. By the **definition of** :   **(QED)** |