

Project 2 FYS3150

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CONTENTS

I. Introduction	1
II. Formalism	1
III. Implementation	1
IV. Analysis	1
V. Conclusion	1

where U is a unitary matrix. We need to check that $\mathbf{w}_i^T \mathbf{w}_j = \delta_{ij}$ for arbitrary i and j :

$$\begin{aligned}\mathbf{w}_i^T \mathbf{w}_j &= (\mathbf{U} \mathbf{v}_i)^T (\mathbf{U} \mathbf{v}_j) \\ &= \mathbf{v}_i^T \mathbf{U}^T \mathbf{U} \mathbf{v}_j \\ &= \mathbf{v}_i^T \mathbf{v}_j \\ &= \delta_{ij},\end{aligned}$$

where we have used that \mathbf{U} is a unitary matrix and the orthogonality of the set of vectors \vec{v}_i .

I. INTRODUCTION

II. FORMALISM

A unitary transformation of an orthogonal set of vectors \mathbf{v}_i will conserve the orthogonality of the set of vectors. We show this by writing down the transformed set of vectors as:

$$\mathbf{w}_i = \mathbf{U} \mathbf{v}_i,$$

III. IMPLEMENTATION

IV. ANALYSIS

V. CONCLUSION