**Lab 2a.**

The positions of R, B, G are given as follows:

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

**1.3.1 Task 1.** Find numbers (u, v, w) so that

Compute

**Matlab code:**

Text

Description automatically generated

**Command Window:**

Text, letter

Description automatically generated

**Solution:**

**1.3.2 Task 2.** Find the 2 × 2 matrix A which sends to the coefficients of its representation as a linear combination of and . That is, your matrix should have the following property: when we write

then

**Solution:** We have,

,

Using the same method as Lab1b, by constructing M, D1, D2, we compute O as following:

**Matlab Code:**

Text

Description automatically generated

**Command Window:**

Text, table

Description automatically generated

**1.3.3 Task 3.** Find numbers (depending on and ) such that

**Solution:**

Require , so

Hence

Hence,

**1.3.4 Task 4.** Apply your result from Task 3 to compute the representation for the color .

**Matlab Code:**

**Text, letter

Description automatically generated**

**Command Window:**

**Text

Description automatically generated**

**Solution:**

First,

Hence,

**1.3.5 Task 5.** For a given color the is defined as the unique color such that a uniform mixture of and creates white, that is

Find the representation for the complementary color of .

**Matlab Code:**

**Text

Description automatically generated**

**Command Window:**

**Text

Description automatically generated**

**Solution:**

White is

So, if then,

So, after redoing Task 4 with

Hence,

**Lab 2b.**

**1.4.1 Task 1.** Compute the vectors , for the orbit. Note that should be parallel to , and the length of should be 1. Then given and you can find using

**Matlab Code:**

**Text

Description automatically generated**

**Command Window:**

**Table

Description automatically generated**

**1.4.2 Task 2.** Find the 3 × 3 matrix [Id]EU which changes bases from U to E and use it to find the inverse [Id]UE.

**Matlab Code:**

**Graphical user interface, text, application

Description automatically generated**

**Command Window:**

**Text, table

Description automatically generated**

**1.4.3 Task 3.** The position of the satellite at time t is 3(), which in the standard basis is equal to

where [3]EE is the matrix which implements the rotation about the vector by angle ωt. By changing to the U-basis and using the matrix (12), find the position of the satellite (in the standard basis) at times t = 0.5, 1, 1.5 hours.

**Matlab Code:**

**Text

Description automatically generated**

**Command Window:**

Table

Description automatically generated with medium confidence

**Matlab Code:**

**Text

Description automatically generated**

**Command Window:**

Table

Description automatically generated

**Matlab Code:**

**Text

Description automatically generated**

**Command Window:**

Table

Description automatically generated