Electromagnetics 2FH4
MATLAB Set (1) – Vector Analysis

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Problem

Exercise: Given the vectors R1= ax + 2ay + 3az, R2=3ax + 2ay + az. Find a) the dot product R1: R2 , b) the projection of R1 on R2 , c) the angle between R1 and R2.

Solution

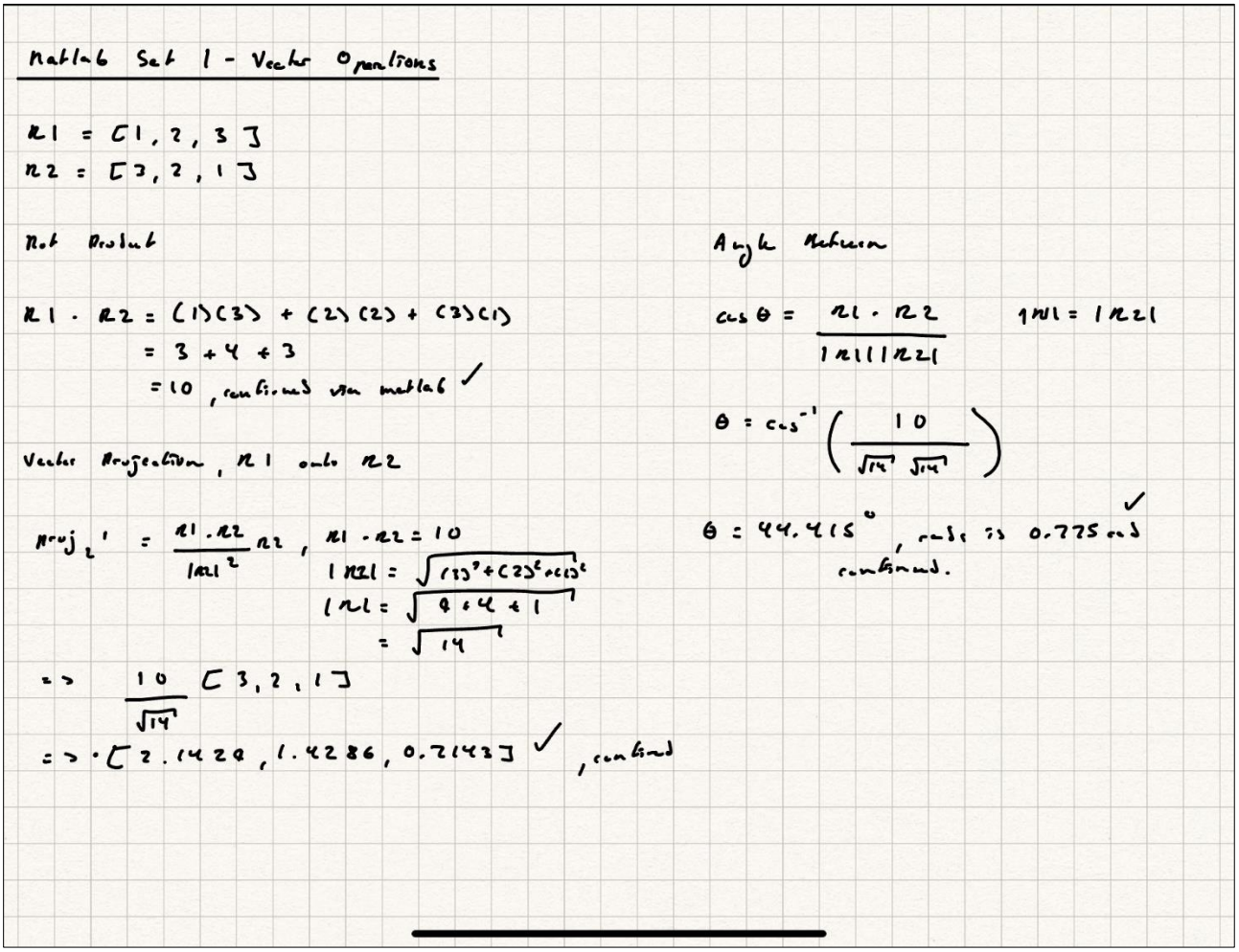
Consider,

```
R1 = [1, 2, 3];
R2 = [3, 2, 1];

% Dot product between R1 and R2
dotP = dot(R1,R2)

% Projection of R1 onto R2
proj = (dotP/norm(R2)^2) * R2

% Angle between R1 and R2
angle = acos(dotP / (norm(R1)*norm(R2)))
```

With the following output,

```
dotP =

    10

proj =

    2.1429    1.4286    0.7143

angle =

    0.7752
```

Also consider the hand-calculated solution,



Which results in the same values as found in MATLAB, relatively speaking.