PROBLEM 2

```
clear variables; close all; clc

data_table_mag = readtable('Magnetometer_Prob_2.csv');
```

```
Warning: Column headers from the file were
modified to make them valid MATLAB
identifiers before creating variable names
for the table. The original column headers
are saved in the VariableDescriptions
property.
Set 'PreserveVariableNames' to true to use
the original column headers as table
variable names.
```

Magnetometers

```
bias_mag =[-12.11214937;
           -19.67616054;
            22.73696197];
var_mag = [0.467656955 0          0;
           0         0.744016854  0;
           0         0          0.463154807];


mag_x = data_table_mag{:, 2};
mag_y = data_table_mag{:, 3};
mag_z = data_table_mag{:, 4};

mag_x_wo_bias = mag_x - bias_mag(1);
mag_y_wo_bias = mag_y - bias_mag(2);
mag_z_wo_bias = mag_z - bias_mag(3);

magnetic_heading_data = -atan2( mag_y_wo_bias, mag_x_wo_bias );
declination    = -14.07*pi/180;
% Declination  for Worcester, MA found using World Magnetic Model
% https://www.ngdc.noaa.gov/geomag/calculators/
magcalc.shtml#declination

true_heading_data = declination + magnetic_heading_data;
true_heading_mu  = mean(true_heading_data)
disp('rad')
true_heading_var = var(true_heading_data)
disp('rad')


fprintf('The heading is %f deg +/- %f deg\n', ...
 true_heading_mu*180/pi, 3*sqrt(true_heading_var)*180/pi);

Validity = ['This heading is accurate given the orientation of the
 device '...
```

```
    'and that the positive x axis faced west'];
disp(Validity)
```

```
true_heading_mu =

   -1.4815

rad

true_heading_var =

   1.3227e-05

rad
The heading is -84.881480 deg +/- 0.625142 deg
This heading is accurate given the orientation of the device and that
 the positive x axis faced west
```

Published with MATLAB® R2020a