[1]. In the given figure, the coefficient of static friction between the inclined plane and mass m 1 is $\mu$.
Assume that the pulleys are frictionless and have no masses. Write MATLAB GUI, to perform a simulation and animation of the system for the given m 1 and m 2 .

[2]. Magnetic field around a long-wire carrying current $i$ can be calculated from:

$$
B(r)=\frac{\mu_{0} i}{2 \pi r}
$$

where $r$ is the distance measured form the wire and is the magnetic permeability constant. Table shows the experimental results of the measured magnetic fields, $B$, corresponding to the distance $r$. The current in the wire is $\mathrm{i}=1 \mathrm{~A}$.

Write a program to determine value of $\mu_{0}$
(a) by using LSF method
(b) by using fminsearch() function
(c) by using Monte Carlo method.


Your program must plot both the data and fitting functions on the same axis.
[3]. A woman has N children, the probability of each child being female is $50 \%$. Write a program to determine the probability for $\mathrm{N}=1,2,3, \ldots .12$. Use a billon random events.
[4]. Using sound card, write a Matlab GUI to measure the gravitational acceleration using a simple pendulum.
[5]. Write a program to perform any project that uses the sound card.

