

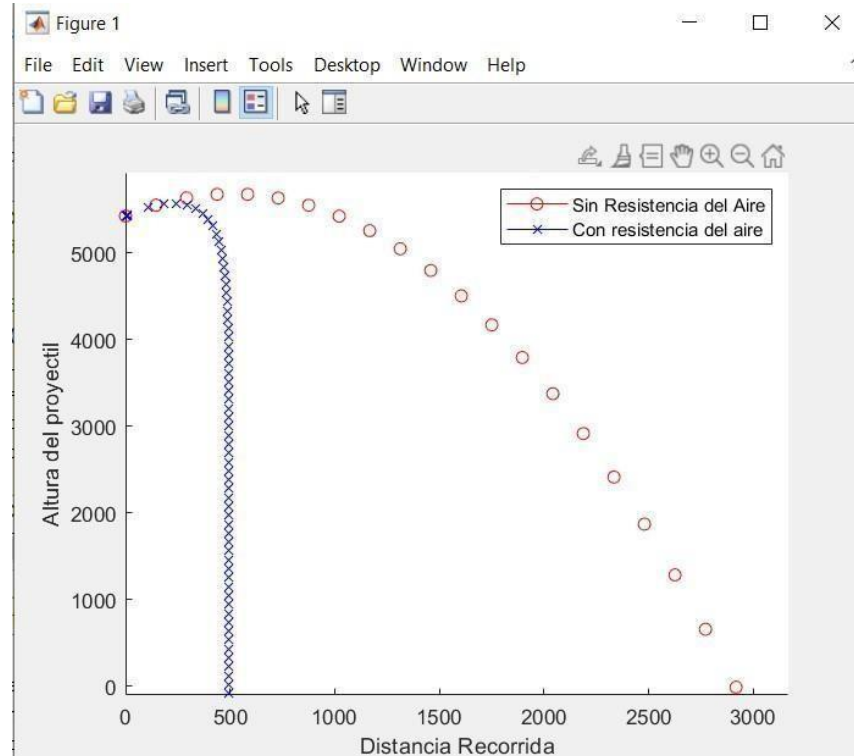
## MATLAB Physics Simulations

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Here we can see the inputs that are required to make the volcano projectiles simulation, where we have the output angle, initial velocity, volcano height, air resistance, velocity exponent and projectile mass.

```
>> Volcan
Dame el angulo de salida del proyectil en grados: 45
Dame la Velocidad Inicial del Proyectil en m/s: 100
¿Cuánto mide el Volcan?(m): 5426
Medida de la resistencia del aire: 5
Exponente de la Velocidad entre 1.1 y 1.9: 1.5
¿Cuánto pesa el proyectil?(kg): 250
fx |
```

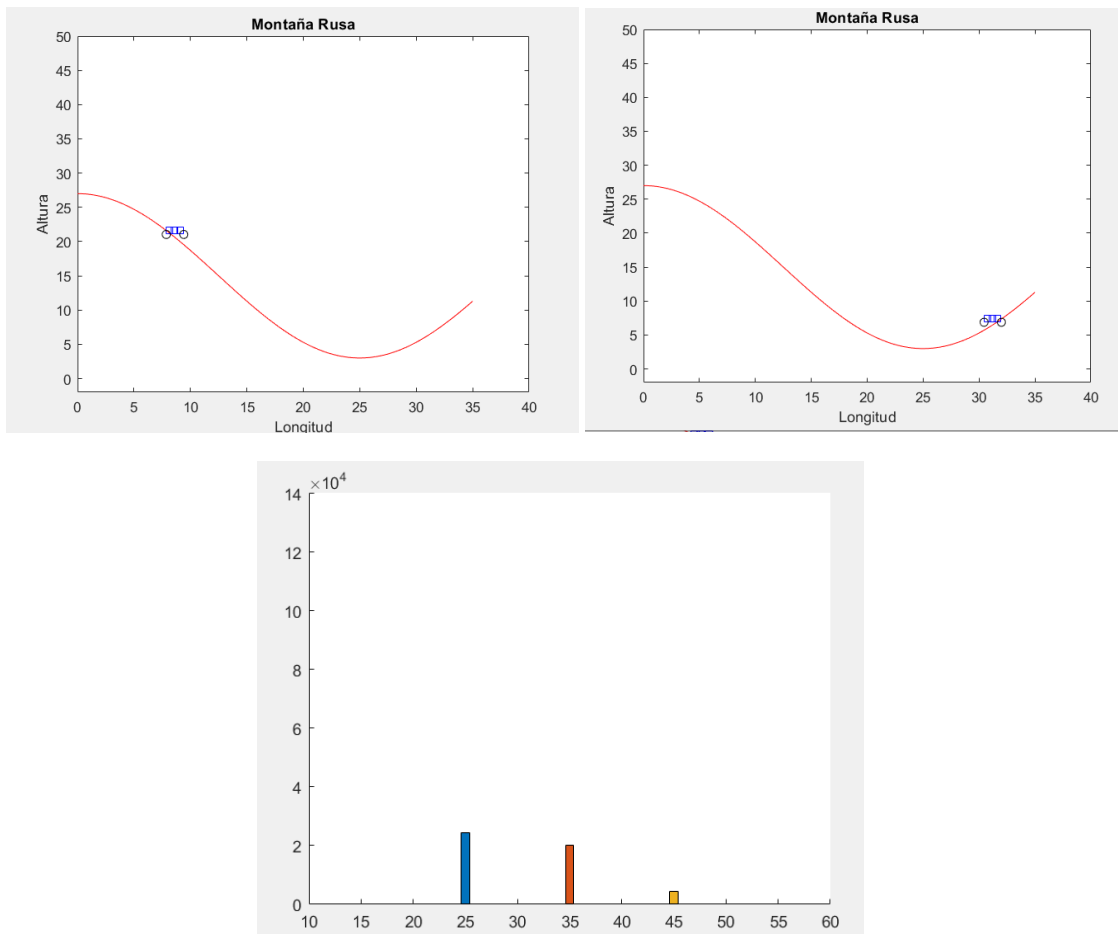
Having this information, we can see the graphic with air friction and without it, but I must mention that this is an animation, so running the code makes a real time demo.



Now we can see the inputs for the roller coaster simulation, where we have initial velocity, air resistance, cart mass, friction coefficient of the track, roller coaster length, initial position of the cart and t delta.

```
>> Montana_rusa
Dame la Velocidad Inicial del carrito en m/s: -50
Medida de la resistencia del aire: 3
¿Cuánto pesa el carrito?(kg): 100
Dame el coeficiente de friccion de la pista(menor a .5): 0.1
Dame la longitud de la montaña rusa: 35
Dame la posicion inicial del carrito: 30
Dame delta t: 0.03
```

Here is the real time demo, where we have the representation of the roller coaster that shows the trajectory and another window that shows the changes of the kinetic, mechanical and potential forces.



We made too an implementation in app designer to have a more visual project and in this case, the forces are shown as arrows in the cart, and they change of size, fitting the scale so we can have a better idea of what is happening.

