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In [1]: import math
        #step 1: input parameters
        print("enter the properties of the football and environment:")
        diameter=float(input("diameter of the football(in meters, e.g., 0.222 for 22 cm):"))
        speed=float(input("speed of the football(in m/s):"))
        air_density=float(input("air density(in kg/m^3, e., 1.225 at sea level):"))
        drag_coefficient=float(input("drag coefficient(e.g., 0.47 for a smooth sphere):"))

        enter the properties of the football and environment:
        diameter of the football(in meters, e.g., 0.222 for 22 cm):0.33
        speed of the football(in m/s):20
        air density(in kg/m^3, e., 1.225 at sea level):1.225
        drag coefficient(e.g., 0.47 for a smooth sphere):0.47

In [3]: #step 2: estimate the cross-sectional area of the football
        radius=diameter/2
        area=math.pi*radius**2 #approximation of the exposed area of a sphere

In [4]: #step 3: simulate the interaction with air
        # air resistance is determined by the speed,size,and air properties
        #here, we step through the logical components
        print("\ncalculation air resistance...")
        print(f"cross-sectional area of the football:{area:.4f}m^2")
        print(f"air density:{air_density:.3f}kg/m^3")
        print(f"drag coefficient:{drag_coefficient:.2f}")

        calculation air resistance...
        cross-sectional area of the football:0.0855m^2
        air density:1.225kg/m^3
        drag coefficient:0.47

In [5]: air_resistance=0.5*drag_coefficient*air_density*area*(speed**2)

In [7]: print(f"\nair resistance acting on the football:{air_resistance:.2f}N")

        air resistance acting on the football:9.85N

In [8]: print("\nfactor influencing air resistance:")
        print("-increasing speed will significantly increase air resistance(quadratic relationship).")
        print("-larger football experience more air resistance due to a greater exposed surface.")
        print("-denser air (e.g., at lower altitudes)increase air resistance.")

        factor influencing air resistance:
        -increasing speed will significantly increase air resistance(quadratic relationship).
        -larger football experience more air resistance due to a greater exposed surface.
        -denser air (e.g., at lower altitudes)increase air resistance.
```