Abdelhafid Boussouf University Center- Mila **Academic Year: 2024-2025**

Natural and Life Science Institute **Earth and Universe Science**

Tutorial Exercises in Physics 1 / Set 2

Exercise 1:

Given the vectors $\vec{A} = 2\vec{\imath} - \vec{\jmath} + \vec{k}$, $\vec{B} = \vec{\imath} + 2\vec{\jmath} - 3\vec{k}$, $\vec{C} = 3\vec{\imath} - 2\vec{\jmath} + 4\vec{k}$

1. Determine the modulus of each vector
2. Calculate $\vec{A} + \vec{B} + \vec{C}$ then the unit vector
3. Calculate $\vec{U} = 2\vec{A} + \vec{B}$, $\vec{V} = 3\vec{A} - 5\vec{B}$, $\vec{W} = \vec{A} - 2\vec{B} + 5\vec{C}$
4. Find the dot product $\vec{U}.\vec{V}$, $\vec{U}.\vec{W}$, $\vec{V}.\vec{W}$ and the angles $(\vec{U}.\vec{V})$, $(\vec{U}.\vec{W})$

Exercise 2:

Given three vectors $\vec{A} = 2\vec{\imath} + \vec{\jmath} - 3\vec{k}$, $\vec{B} = \vec{\imath} - 2\vec{\jmath} + \vec{k}$

1. Calculate the dot product $\vec{A}.\vec{B}$ and deduce the angle formed by these two vectors
2. Calculate the cross product $\vec{V} = \vec{A} \wedge \vec{B}$ and deduce with another method the angle formed by these two vectors
3. We have $\vec{W} = a\vec{\imath} + b\vec{\jmath} - 3\vec{k}$, find a and b so that $\vec{W}$ and $\vec{V}$ in the same direction.