Homework 02 (23Mar22)

Name: `your name`

Rubric for each assignment:

Context	Points
Precision of the answer	80%
Answer Markdown readability	10%
Code readability	10%

Guidance:

- Upload your answers in the Blackboard submission portal as:

  lastname-firstname-labwork-xx.pdf or **lastname-firstname-labwork-xx.ipynb**

Table of Problems

Problem 1 (20 pts)

Derive the streaming term, $\nabla_{\mathbf{x}} \varphi \cdot \hat{\mathbf{v}}$, in cartesian coordinates, where $\varphi(\mathbf{x}, E, \hat{\mathbf{v}}, t)$ is the magnitude of the neutron flux, and $\hat{\mathbf{v}}$, the neutron direction of travel vector.

Answer:

Problem 2 (20 pts)

Derive the streaming term, $\nabla_{\mathbf{x}} \varphi \cdot \hat{\mathbf{v}}$, in spherical coordinates, where $\varphi(\mathbf{x}, E, \hat{\mathbf{v}}, t)$ is the magnitude of the neutron flux, and $\hat{\mathbf{v}}$, the neutron direction of travel vector.

Answer:

Problem 3 (20 pts)

Derive the streaming term, $\nabla_{\mathbf{x}} \varphi \cdot \hat{\mathbf{v}}$, in (circular) cylindrical coordinates, where $\varphi(\mathbf{x}, E, \hat{\mathbf{v}}, t)$ is the magnitude of the neutron flux, and $\hat{\mathbf{v}}$, the neutron direction of travel vector.

Answer:

Problem 4 (20 pts)

Derive the streaming term, $\nabla_{\mathbf{x}} \varphi \cdot \hat{\mathbf{v}}$, in elliptic cylindrical coordinates, where $\varphi(\mathbf{x}, E, \hat{\mathbf{v}}, t)$ is the magnitude of the neutron flux, and $\hat{\mathbf{v}}$, the neutron direction of travel vector.

Answer:

Problem 5 (20 pts)

Derive the streaming term, $\nabla_{\mathbf{x}} \varphi \cdot \hat{\mathbf{v}}$, in prolate spheroidal coordinates, where $\varphi(\mathbf{x}, E, \hat{\mathbf{v}}, t)$ is the magnitude of the neutron flux, and $\hat{\mathbf{v}}$, the neutron direction of travel vector.

Answer: