(Preview of) Midterm Exam No. 02 (2024 Spring)

PHYS 510: CLASSICAL MECHANICS

School of Physics and Applied Physics, Southern Illinois University–Carbondale

Date: 2024 Apr 4

1. (**20 points.**) On Lagrangian mechanics
2. (**20 points.**) On Lagrangian multipliers
3. (**20 points.**) On normal modes
4. (**20 points.**) Given
$$\mathbf{r} = x\hat{\mathbf{i}} + y\hat{\mathbf{j}} + z\hat{\mathbf{k}} \tag{1}$$
and
$$\boldsymbol{\phi} = -y\hat{\mathbf{i}} + x\hat{\mathbf{j}}, \tag{2}$$
determine a such that
$$\hat{\mathbf{z}} \times \hat{\mathbf{r}} = a\,\hat{\boldsymbol{\phi}} \tag{3}$$
is an identity.
5. (**20 points.**) On any topic. Maybe, small angle approximation.