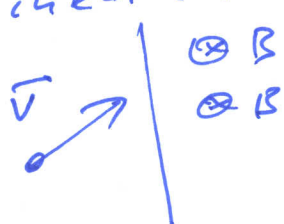


① Find the time-dependence of oscillation frequency of a pendulum if the gravitational constant is a function of time - $G_N(t)$.

② Calculate $e^{\left(\frac{d}{dx} + \alpha x^n\right)} \cdot \mathbb{I}$.

③ A particle flies into a half-space filled by a homogeneous magnetic field. Find conditions that the particle is confined in the $1/2$ -space with magn. field



④ Compute $\lim_{\epsilon \rightarrow 0} \text{Sp} \left[\gamma_5 e^{+\epsilon \hat{D}^2} \right]$, where $\hat{D} = \gamma_\mu \nabla^\mu$ is the Dirac operator in external gauge field in D -dimension

⑤ $\int_{-1}^1 dx e^{-\frac{1}{2}x^2 - gx^\alpha} = \sum_{n=0}^{\infty} c_n g^n$, find asymptotic of c_n at $n \rightarrow \infty$.

⑥ In QM one proves that a quantum state has no electric dipole moment. Why H_2O molecule is an electric dipole?