Assignment 7

https://github.com/jchryssanthacopoulos/quantum_information/tree/main/assignment_7

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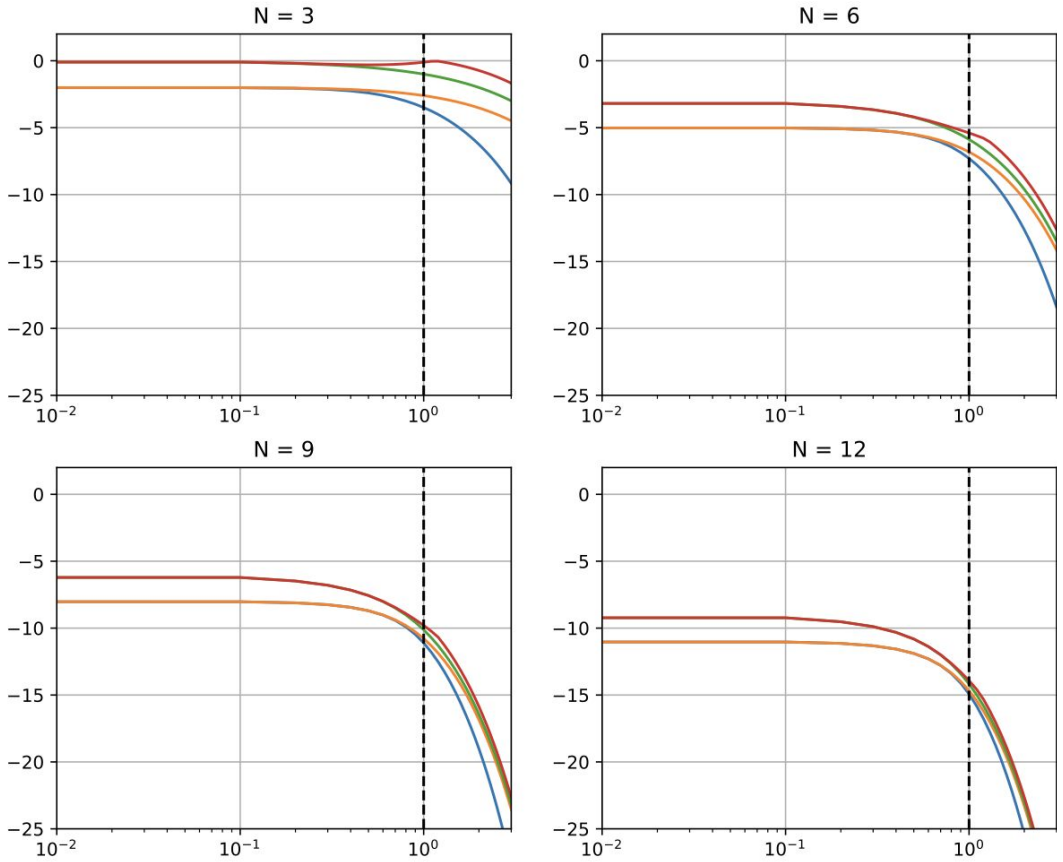
Energy Levels for Different λ and N

- First and second energy levels degenerate when λ is small
- Energy levels split when external magnetic field becomes strong enough
- Phase transition occurs when $\lambda \sim 1$, as expected



Energy Gap for Different λ and N

- Similar to last figure, energy gap between first and second levels becomes non-zero around $\lambda \sim 1$, but splitting shrinks with increasing N
- Difference between third and first levels non-zero even for small λ, making third level the first excited state, but again the gap shrinks with increasing N