A Brief Analysis

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Abstract

Potential energy functions are used to visualize the motions of a particle. In this short paper, we look at the plots for potential energy functions, $U(s) = -\frac{1}{3}\mu_0 s^{-3\gamma+2} - \frac{1}{3}\Lambda s^2$, for varying cases.

1 Overview

Knowing that $0 \leq \gamma \leq 2$, and $\Lambda \geq 0$, the following cases were evaluated:

1.1 Case 1: $\Lambda = 0$

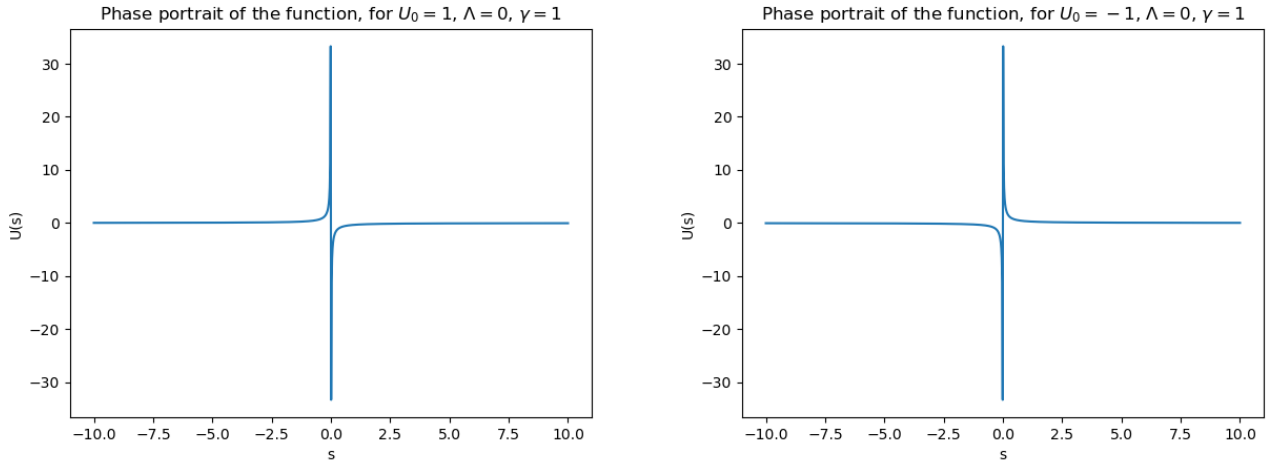
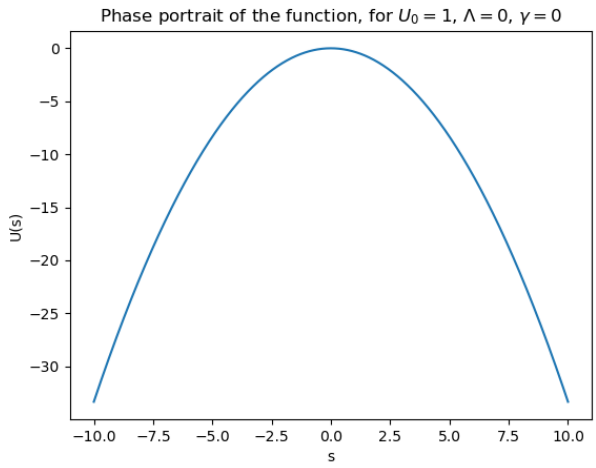


Figure 1: Phase portraits for $\gamma > 2/3$



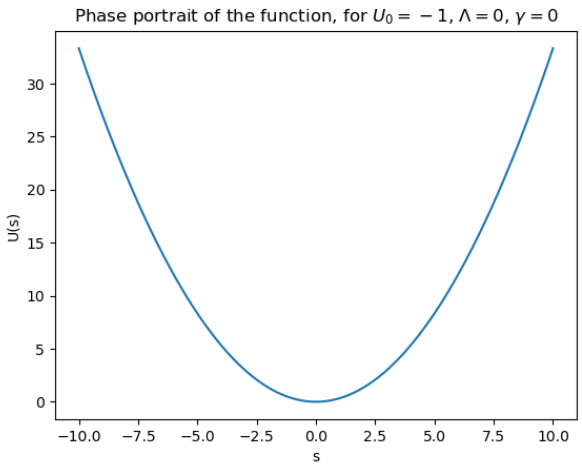
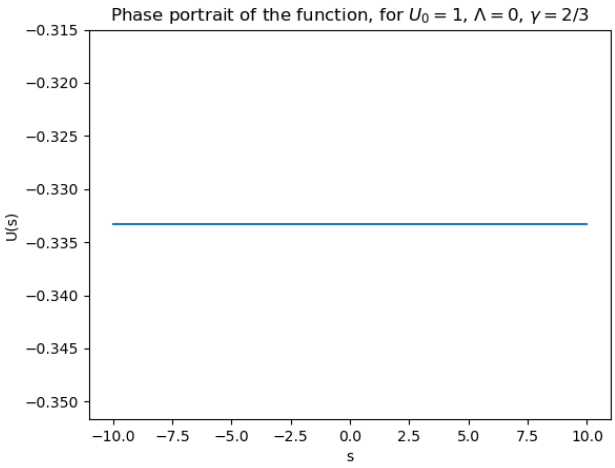


Figure 2: Phase portraits for $\gamma < 2/3$



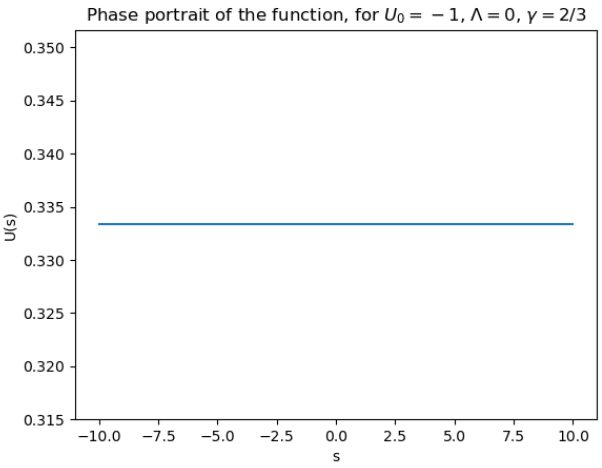


Figure 3: Phase portraits for $\gamma = 2/3$

1.2 Case 2: $\mu_0 = 0$

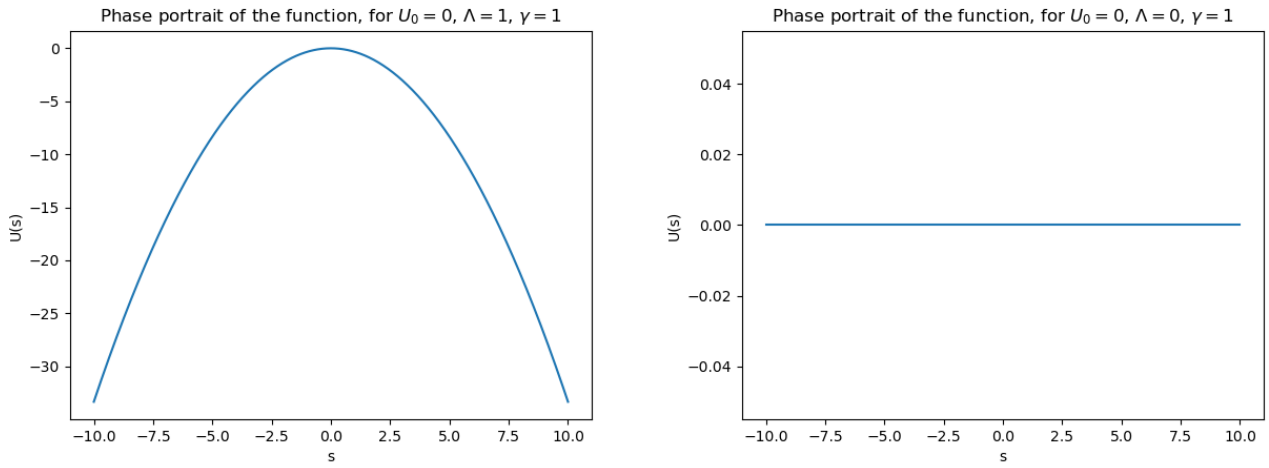


Figure 4: Phase portraits for $\mu_0 = 0$

1.3 Case 3: $\gamma > 2/3$

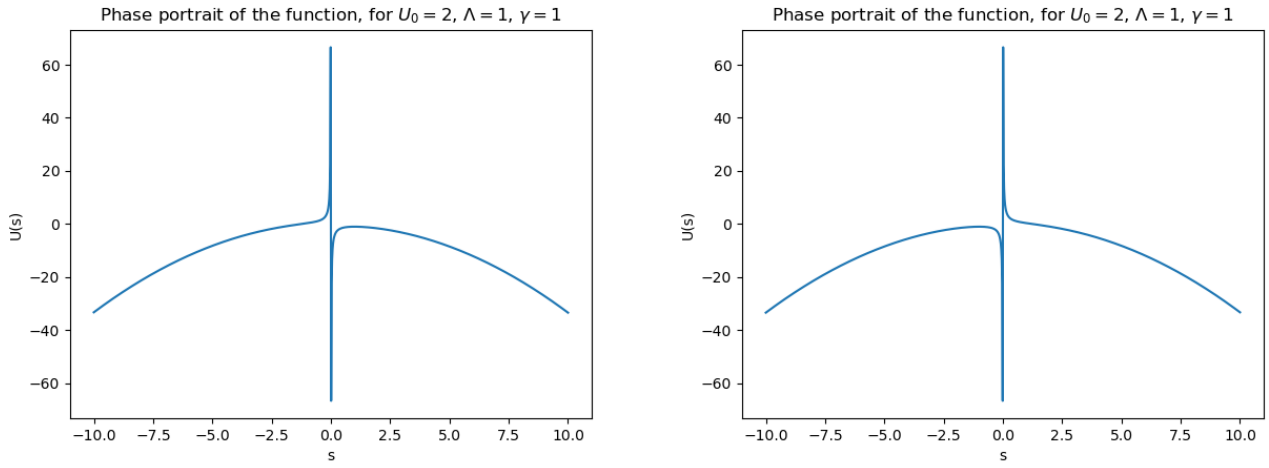


Figure 5: Phase portraits for $\gamma > 2/3$