Fall avoidance via hierarchical task-switching control of the simplest dynamic walker

Navendu Patil   Jonathan Dingwell   Joseph Cusumano
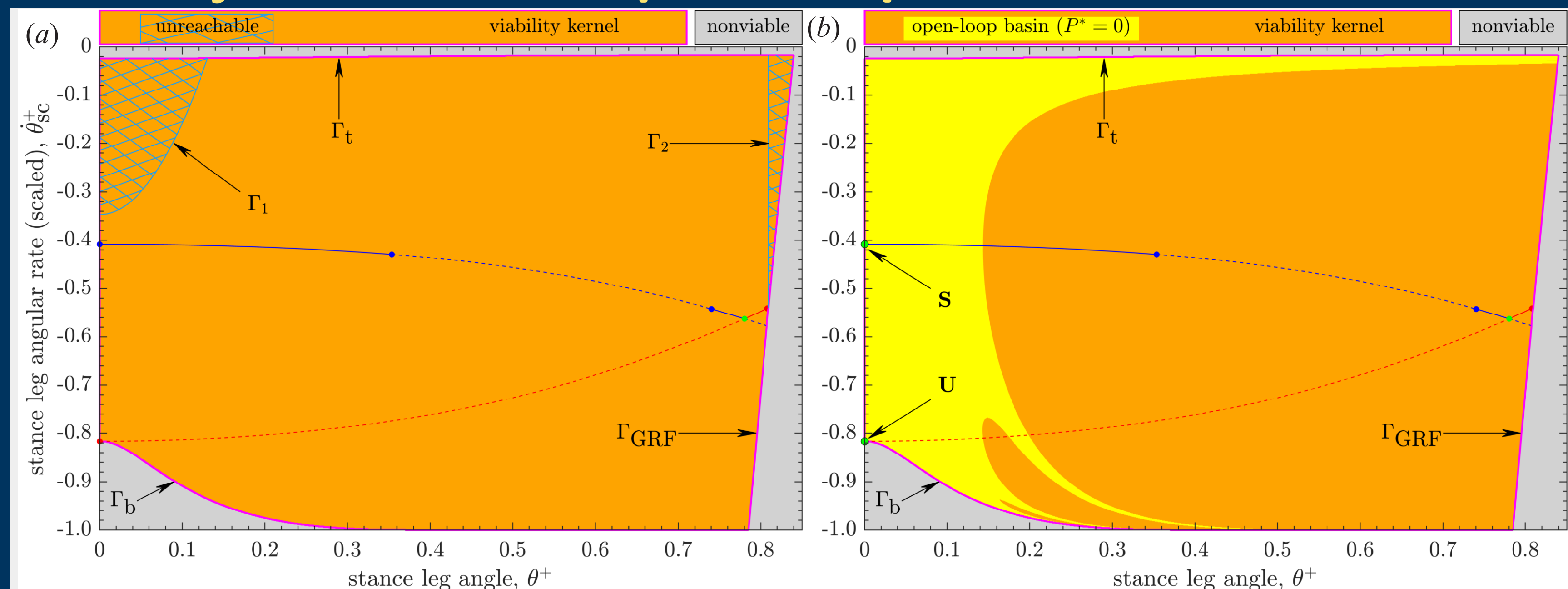
Overview

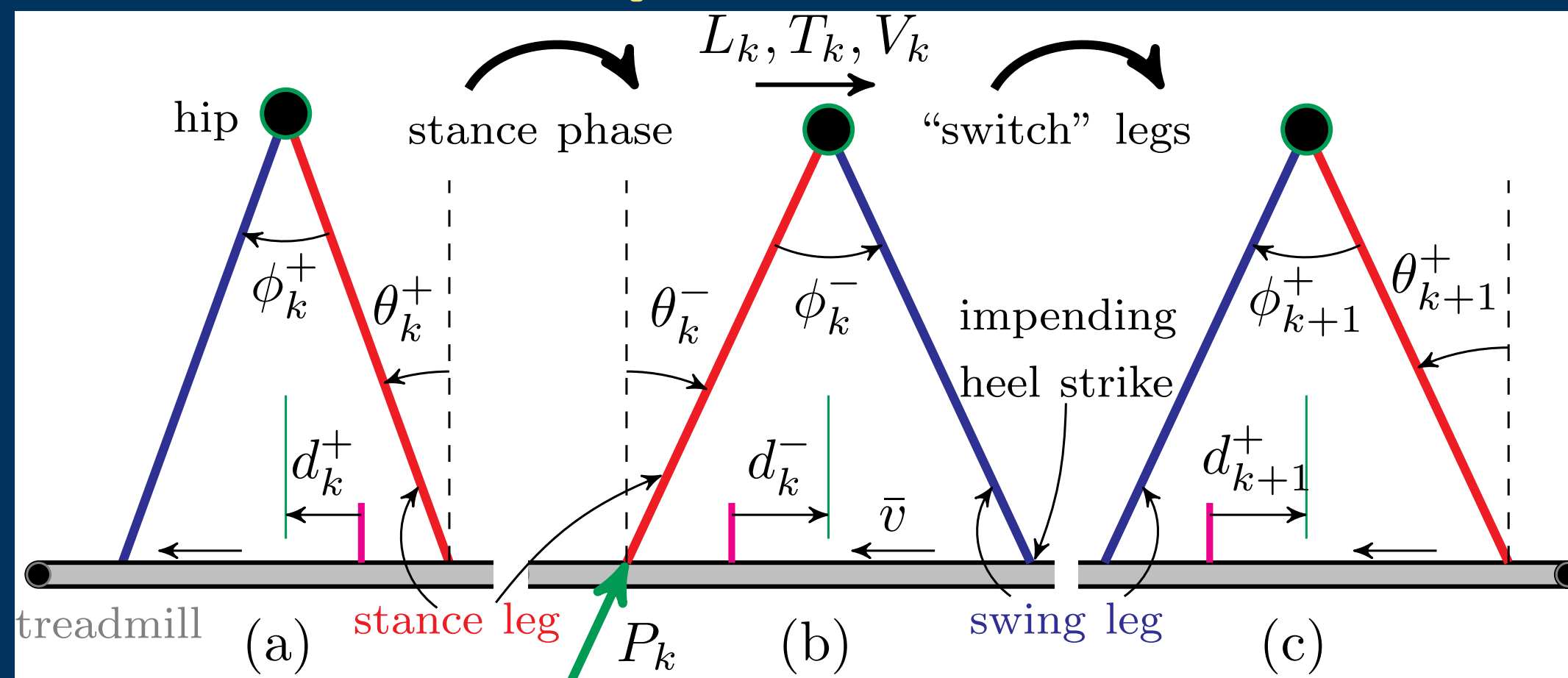**task-level regulation $\leftrightarrow$ global stability**

<u>Hierarchical schema</u> for biological movement:
Control to remain **viable** (avoid falls).
Regulation to achieve **task-level goals**.

Our results suggest high-level, adaptive fall-avoidance strategies based on **cognitively less-demanding switching** between 'crystallized' walking **tasks.**
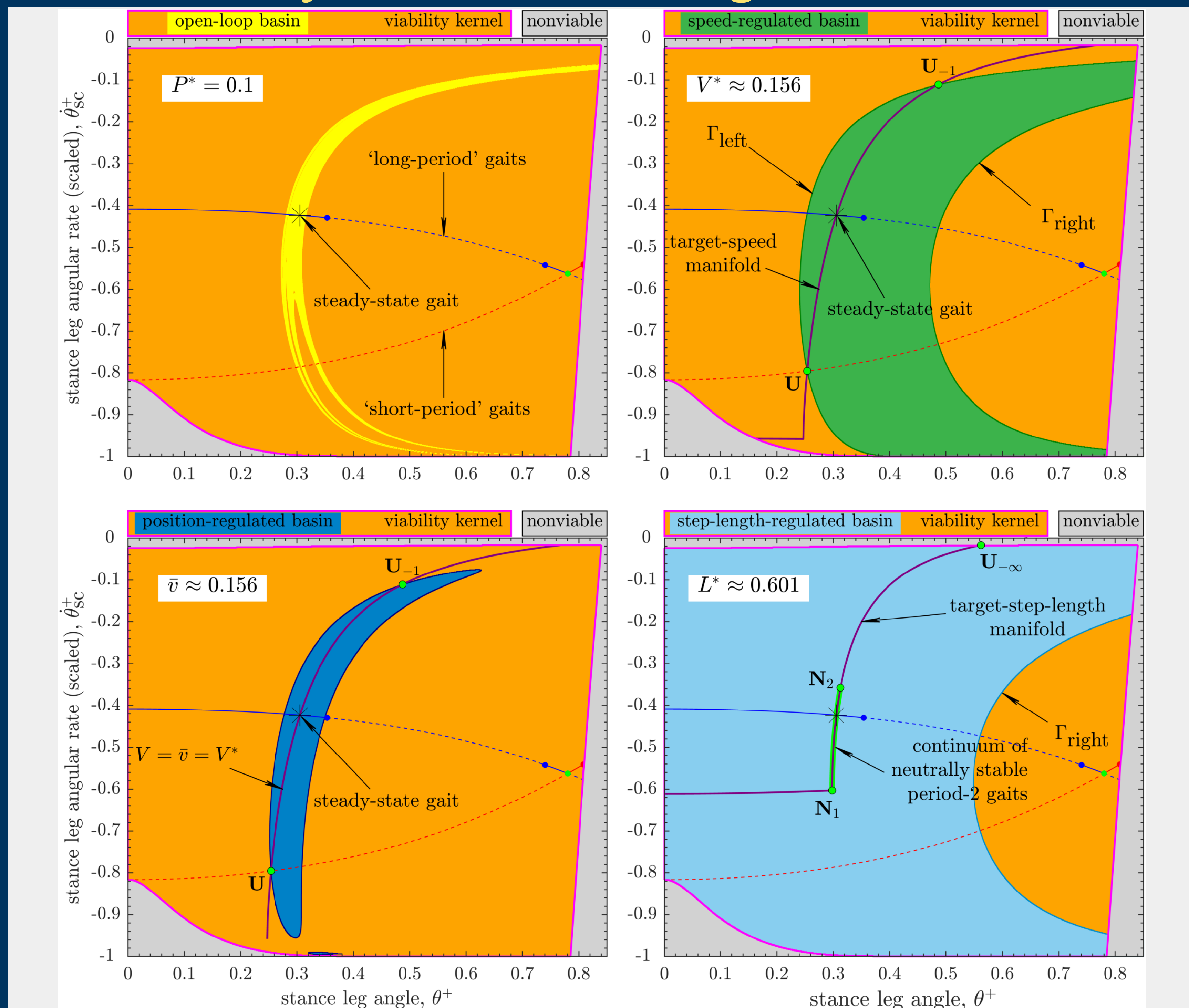
Powered compass walker

Viability via task switching control

Viability kernel of the push-off-powered walker

Global stability under task-level regulation