

points from a continuum. The key insight is that each equilibrium point must be shown to be Lyapunov stable, and this requires treating the Lyapunov function as a parameterized family indexed by the equilibrium point.”

“Consider the Lyapunov function V from Lemma 3 as a parameterized family $\{V_{z^*}\}_{z^* \in \mathcal{M}}$... This family is well-defined (non-degenerate) for all $z^* \in \mathcal{M}$ because $(c_i + \lambda_i^*) \geq c_i > 0$.”

Comment 10: The requirement imposed in Corollary 1 is quite strong and may pose challenges in both theoretical analysis and practical implementation... A promising direction to relax this requirement would be to introduce proximal (or regularization) terms on the primal side.

Response: We added:

“The corollary’s requirement that all constraints be strictly active ($\lambda_i^* > 0$) can be relaxed using regularization approach with $c_i = \varepsilon > 0$ as detailed in Section VI.”

We note that introducing proximal terms on the primal side is a promising direction—directly addressing the reviewer’s suggestion.

Comment 11: In the presented examples, the actual robust optimization setting—particularly with scenario-based uncertain constraints—is not fully addressed. In addition, the reviewer was expecting to see results related to convergence analysis, including the stability of the proposed approach and its convergence to optimal points.

Response: We do compare with scenario-based approaches in both Example A and Example B. From the paper:

“Example A: By picking 1115 samples from the intersection of ellipsoids uncertainty set and solving the derived deterministic optimization problem with 1115 constraints by CVX...”

“Example B: We compared with scenario-based sampling: using CVX, 168 scenarios gave solution $[0.5376, 0.8193]$ with cost 0.8039 (2.3s), 500 scenarios gave $[0.5312, 0.8024]$ with cost 0.8287 (8.7s), and 1000 scenarios gave $[0.5289, 0.7953]$ with cost 0.8371 (31.2s). Our dynamics achieved the exact solution in 0.8s.”

Convergence plots are presented in the paper: Figure 1 shows Example A trajectories converging to the optimal solution, and Figure 3 shows Example B convergence. Detailed convergence rate analysis is beyond the scope of this paper and is left for future work.

Regarding technical note vs. full article: We respectfully argue that this work merits publication as a full article. The manuscript presents: (i) Novel theoretical framework—an entirely new approach to RO through continuous-time dynamics, (ii) Comprehensive technical contributions—complete dynamical system with rigorous stability analysis (Theorems 1-4), novel Lyapunov construction, proof of convergence without joint concavity assumptions, (iii) Broad applicability—solutions for problems where existing methods fail entirely.