Response to Reviewer 10

The reviewer acknowledges the authors' efforts in addressing a relevant and timely problem. The core idea presented is original and points toward a promising research direction with potential impact.

However, the current manuscript has several important limitations in terms of technical depth and presentation, which make it unsuitable for publication as a full research article. Given the value of the contribution, the reviewer encourages the authors to consider re-submitting the work in the form of a technical note.

Comment 1: *The abstract is overly long, and the writing style—both in the abstract and throughout the paper—could benefit from greater clarity and conciseness. In several places, long sentences obscure the intended message, making the content harder to follow.*
Response: The abstract has been revised for clarity and conciseness:

"We propose a continuous-time dynamical system for solving robust optimization problems in a general framework where the problem is convex in the decision variable and concave in the uncertainty... We demonstrate that the globally asymptotically stable equilibrium point of the introduced dynamics can recover robust optimal solutions for robust optimization problems without requiring reformulations."

Throughout the manuscript, we systematically improved writing by splitting long sentences, standardizing technical terminology, and carefully proofreading.

Comment 2: *Footnote 2, related to Optimization Problem 2, should include the assumption that the constraint functions are continuous with respect to the uncertain variable.*
Response: We added:

"Since the uncertainty set is compact and the constraint functions are continuous, the supremum is attained within the set; therefore, we can replace 'sup' with 'max' in our formulation."

Comment 3: *The novelty of Lemma 1 and its proof is unclear. From the reviewer's point of view, it appears to reflect a standard saddle point property within the context of Lagrangian duality. Under the usual convex–concave assumptions, similar inequality chains follow from well-known results such as Sion's or Rockafellar's saddle point theorems.*
Response: Lemma 1 is NOT a standard result. We added a remark explaining why:

"Classical results such as Sion's minimax theorem or Rockafellar's saddle point theorem require joint concavity in the maximization variables. The Lagrangian $\mathcal{L}(x, \lambda, u, v)$ is jointly convex in (x, v) for fixed (λ, u), but not jointly concave in (λ, u) for fixed (x, v) due to product terms $(c_i + \lambda_i) \cdot f_i(x, u_i)$ that create bilinear coupling. This violation of joint concavity renders existing primal-dual methods inapplicable."

Comment 4: *Regarding Assumption 3, the strict positivity of the C parameter is mathematically convenient but may be overly rigid for practical modeling purposes. The manuscript does not discuss empirical strategies for selecting these parameters.*
Response: We use $c_i = 10^{-6}$ in all simulation examples, which works well in practice. Other small positive values also work—the choice is flexible as long as $c_i > 0$. We added:

"Assumption 3 provides regularization for inactive constraints. In practice, small values (e.g., $c_i = 10^{-6}$) ensure numerical stability while maintaining solution accuracy. The exact value is not critical—any small positive c_i suffices. Section VI analyzes the $c_i \to 0$ limit rigorously, with Theorem 2 proving convergence as $\varepsilon \to 0$."

Comment 5: *There is a notation inconsistency in item 1 of the one-uncertain-constraint example: the variable u_i should be written as u_1 for clarity and consistency.*
Response: Corrected.

Comment 6: *To improve readability, the reviewer suggests introducing the Z parameter directly after the compact notation for the robust optimization formulation (23).*
Response: The state vector structure is now described immediately after the dynamics in equation (23), where we explain that $z := (x, \lambda, u, v) \in \mathbb{S}$ represents the combined state.

Comment 7: *In Equation (36) within the proof of Lemma 3, there appear to be two missing parentheses.*
Response: Corrected all missing parentheses in Equation (36) and subsequent equations.

Comment 8: *Remark 4 raises an important technical point but would benefit from clearer formulation and improved writing. The content of the remark could be more effectively communicated if it were split into two separate parts.*
Response: Remark 4 has been improved for clarity by better organizing its content.

Comment 9: *From the reviewer's perspective, the conclusion presented in the final paragraph of the proof of Theorem 4 is neither straightforward nor self-evident. To improve clarity and support the argument, further elaboration and justification are recommended.*
Response: We significantly expanded the final part of Theorem 1's proof (formerly Theorem 4):

"When the set $\mathcal{M}$ of optimal solutions forms a continuum (uncountably many equilibria), asymptotic stability is not the appropriate stability notion. Instead, we employ semi-stability theory, which establishes convergence to individual equilibrium