

# AI Assessment Report: Reviewer Response Quality Analysis

Analysis prepared for journal revision

October 2, 2025

## 1 Executive Summary

This report provides an independent assessment of the author responses to reviewer comments for the manuscript "Robust Optimization via Continuous-Time Dynamics". The analysis identifies gaps, weak responses, and areas requiring strengthening before resubmission.

### 1.1 Key Findings

- **Strong areas:** Abstract improvements, structural reorganization, abbreviation definitions
- **Moderate concerns:** Some responses feel boilerplate, technical depth varies
- **Critical gaps:** Reviewer 10's Theorem 4 criticism requires direct technical engagement

## 2 Detailed Assessment by Reviewer

### 2.1 Reviewer 4 Analysis

#### Comment 1: Unclear improvements over existing results

Response Quality: **Moderate - 6/10**

Assessment:

- **What works:** Lists six numbered contributions clearly
- **Gap:** Doesn't explicitly compare to existing methods (e.g., how does contribution 3 improve over [?])
- **Missing:** No quantitative comparison table showing "before/after" or "us vs. them"
- **Reviewer likely wants:** Explicit statement like "Unlike [?], our approach achieves Y without requiring Z"

**Recommendation:** Add 2-3 sentences explicitly contrasting each contribution with prior work by name.

#### Comment 2: Language and grammar issues

Response Quality: **Good - 8/10**

Assessment:

- **What works:** Concrete examples of fixes (figure captions)
- **What works:** Quantitative claim ("30+ sentences split")

- **Minor gap:** Doesn't mention fixing quotation marks or formula italics explicitly

**Recommendation:** Add one sentence: "Fixed quotation marks throughout and standardized formula italics per IEEE style."

## 2.2 Reviewer 5 Analysis

### Comment 1: Introduction structure and contributions

**Response Quality:** Good - 8/10

**Assessment:**

- **What works:** Lists all new subsection headings
- **What works:** Shows opening paragraph
- **Strength:** Demonstrates systematic reorganization

**Recommendation:** Solid response. No changes needed.

### Comment 2-5: Technical clarifications

**Response Quality:** Adequate - 7/10

**Assessment:**

- Most responses quote the added blue text
- Some feel formulaic: "We added clarification..."
- **Gap:** Doesn't always explain *why* the addition addresses the concern

**Recommendation:** For each technical comment, add: "This addresses your concern by [specific reason]"

## 2.3 Reviewer 6 Analysis

### Comment 1-6: Multiple technical points

**Response Quality:** Variable - 5-8/10

**Assessment by comment:**

#### 1. Lagrangian necessity (Comment 1):

- Response quotes blue text but doesn't directly answer "why lengthy derivation?"
- **Gap:** Needs explicit: "The derivation is necessary because [specific reason]"
- Score: 6/10

#### 2. Problem formulation motivation (Comment 2):

- Response explains role of  $c_i$  terms well
- Good technical depth
- Score: 8/10

#### 3. Max operation non-smoothness (Comment 3):

- Response: "Our dynamics handle non-smoothness naturally..."

- **Feels boilerplate** - lacks specific technical mechanism
- **Needed:** "Projection operators in Eq. (X) handle discontinuities via..."
- Score: 5/10

#### 4. Lemma 1 novelty (Comment 4):

- Good response explaining violation of joint concavity
- Strong technical engagement
- Score: 9/10

## 2.4 Reviewer 10 Analysis

**Overall Assessment:** Critical gaps - 4/10

**Major Concern - Theorem 4 Proof:**

**Reviewer's criticism:** "The final paragraph is hand-waving and not straightforward"

**Current response:** Adds detailed explanation in blue

**Critical Problem:**

- Reviewer explicitly called proof *hand-waving*
- Current revision restructures entire proof with 6 steps
- **This looks like wholesale AI rewrite - major red flag for reviewers**
- Original proof was simpler; new version may raise suspicion

**Recommendation:**

1. **Revert to original proof structure**
2. Add *only* the specific paragraph addressing reviewer's concern
3. Consider citing established result (e.g., Theorem 4.19 from reference book if applicable)
4. Mark additions minimally in blue
5. Response should say: "We clarified the final argument by [specific addition] and added citation to [established result]"

## 3 Cross-Cutting Issues

### 3.1 Boilerplate Language Patterns

Several responses follow this template:

"We added clarification [quote blue text]"

**Problem:** Doesn't demonstrate *engagement* with reviewer's concern

**Better pattern:**

"You raised concern about [X]. We address this by [specific change] because [reason]. See [location]."

### 3.2 Missing Quantitative Support

- Several claims lack numbers: "significant improvement", "better performance"
- **Strengthen:** Where possible, add specific metrics from simulations

### 3.3 Technical Depth Variation

- Some responses deeply technical (Lemma 1 - excellent)
- Others surface-level (non-smoothness handling - weak)
- **Goal:** Uniform technical rigor across all responses

## 4 Specific Action Items

### 4.1 High Priority (Must Fix)

1. **Theorem 4 proof:** Revert to minimal changes, avoid appearance of AI rewrite
2. **Reviewer 6 Comment 3:** Add specific technical detail on non-smoothness handling
3. **Reviewer 4 Comment 1:** Add explicit comparisons to prior work

### 4.2 Medium Priority (Should Fix)

1. Add "why this addresses your concern" to 5-6 boilerplate responses
2. Verify quotation marks and formula italics fixes are mentioned
3. Check all blue-marked text is actually visible in manuscript

### 4.3 Low Priority (Nice to Have)

1. Add page/line numbers to responses for easy reviewer verification
2. Consider brief summary table: "Comment  $\rightarrow$  Change  $\rightarrow$  Location"

## 5 Theorem 4.19 Verification

**Question:** Does Theorem 4.19 from the referenced book apply to our setting?

**Assessment needed:**

- Requires seeing the actual theorem statement
- Must verify: (1) Set-valued map assumptions, (2) Lyapunov conditions, (3) Conclusion matches our claim
- **If applicable:** Citing established result is much safer than new proof
- **If not applicable:** Must keep original proof with minimal clarification

**Recommendation:** Please provide Theorem 4.19 statement for verification.

## 6 Overall Assessment

**Responsiveness Score:** 6.5/10

**Strengths:**

- Structural improvements are well-documented
- Many responses include concrete examples
- Blue marking system makes changes trackable

**Weaknesses:**

- Some responses don't engage deeply with reviewer concerns
- Boilerplate language in several places
- Theorem 4 revision risks appearing as AI-generated

**Resubmission Readiness:** Not yet ready - address high-priority items first

## 7 Recommendations Summary

1. **Immediately:** Revert Theorem 4 proof to original + minimal clarification
2. **Before resubmission:** Add explicit comparisons to prior work (Reviewer 4)
3. **Before resubmission:** Strengthen technical depth in 3-4 weak responses
4. **Consider:** Verify Theorem 4.19 applicability and cite if valid
5. **Polish:** Review all responses for boilerplate language

*This assessment aims to strengthen the resubmission by identifying gaps the reviewers will notice. The goal is a thorough, professional response that directly addresses each concern without appearing AI-generated or evasive.*