Cadastral Surveyors in rural areas.
Do you need ambiguity resolution in multi-GNSS PPP for accuracy or integrity?

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Evolution of PPP Model
Over the past two decades, the PPP user model has been constantly evolving. Each iteration, added improvements in terms of accuracy and most notably convergence.

Research objectives
To examine the different performance indicators of PPP and PPP-AR. Determine if Cadastral Surveyors in rural areas need AR for accuracy or for integrity.

Ambiguity Resolution
AR is critical for cm-level positioning but for Cadastral Surveyors, requiring 20cm in rural areas at 95% confidence level, is it required? 20 cm

Importance of integrity monitoring
Integrity is the measure of trust that can be placed in the information supplied by a navigation system. Integrity is important in PPP because
- No reference to local receivers
- All parameters have to be directly accounted for through estimation, elimination or modelling.

PPP Integrity Indicators
Primary integrity indicators examined:
1. Convergence
2. Position Uncertainty
3. Ambiguity Validation (Residual Testing)

1) Convergence: Time needed to achieve 20 cm horizontal

2) Position uncertainty: How realistic is your covariance?

3) Ambiguity validation: Can you trust the solution?
Ambiguity resolution and validation is critical for enabling cm-level accuracy. Ambiguity validation can be utilized as an integrity indicator of solution quality. Ratio testing was selected because it is reliable, simple and straightforward for validation testing.

Future work
Improve stochastic de-weighting scheme and position uncertainty

Conclusion
The role of ambiguity resolution in PPP depends on the accuracy specifications:

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<th>Specifications</th>
<th>Accuracy</th>
<th>Integrity</th>
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<tr>
<td>cm - level</td>
<td>✔️</td>
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<tr>
<td>dm - level</td>
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References

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