Stony Brook University

A TSL Analysis of Japanese Case

Kenneth Hanson
Stony Brook University

Department of Linguistics Stony Brook

Link to Paper

Overview

Background Most linguistic patterns fall within the formal class **tier-based strictly local (TSL)** (Heinz 2018; Graf 2022a). This includes the syntactic distribution of case morphology (Vu et al. 2019).

Goal Provide an in-depth analysis of **case in Japanese** using system of **tiers over MG dependency trees** (Graf 2022b).

Insights All case patterns (structural/lexical, short/long-distance) can be treated in a **uniform manner** which is **computationally simple**.

What is Case?

Case refers to markers of the context/function of a noun phrase. Japanese has four **structural cases**, which mark syntactic context:

- **ga (nominative)** ≈ subject of verb
- **o (accusative)** ≈ direct object of verb
- **ni (dative)** ≈ indirect object of verb
- **no (genitive)** ≈ possessor/subject/object of noun

Some Case Patterns in Japanese

(1) Four structural cases in canonical function
[Mearii no imooto] ga Jon ni ringo o ageta.
Mary GEN sister NOM John DAT apple ACC gave
'Mary's sister gave John an apple.'

(2) Verbal domain: first argument is NOM, then add ACC, DAT
a. Taroo ga hasitta.
Taroo NOM ran
'Taroo ran.'
b. Taroo ga piano o hiita.
Taroo NOM piano ACC played
'Taroo played the piano.'
c. Jin ga Yumi ni hon o ageta.
Jin NOM Yumi DAT book ACC gave
'Jin gave Yumi a book.'

(3) Nominal domain: all arguments are genitive
Taroo no yama no e
Taroo GEN mountain GEN picture
'Taroo's picture of a mountain'

(4) Stative verbs: object is nominative
Yumi ga tenisu ga dekiru.
Yumi NOM tennis NOM can.do
'Yumi can play tennis.'

(5) Finite ECM: emb. subject may be accusative (Kishimoto 2018)
Ken ga [Eri ga/o kawaii to] omotteiru.
Ken NOM Eri NOM/ACC be.cute C think
'Ken thinks that Eri is cute.'

Generalizations

- **Accusative** is assigned to the lowest of 2+ arguments of a verb
- **Dative** is assigned the middle of 3+ arguments of a verb
- **Genitive** is assigned to all arguments of nouns
- **Nominative** is the default case
- Some elements are **invisible** for purposes of case assignment

TSL Syntax in a Nutshell

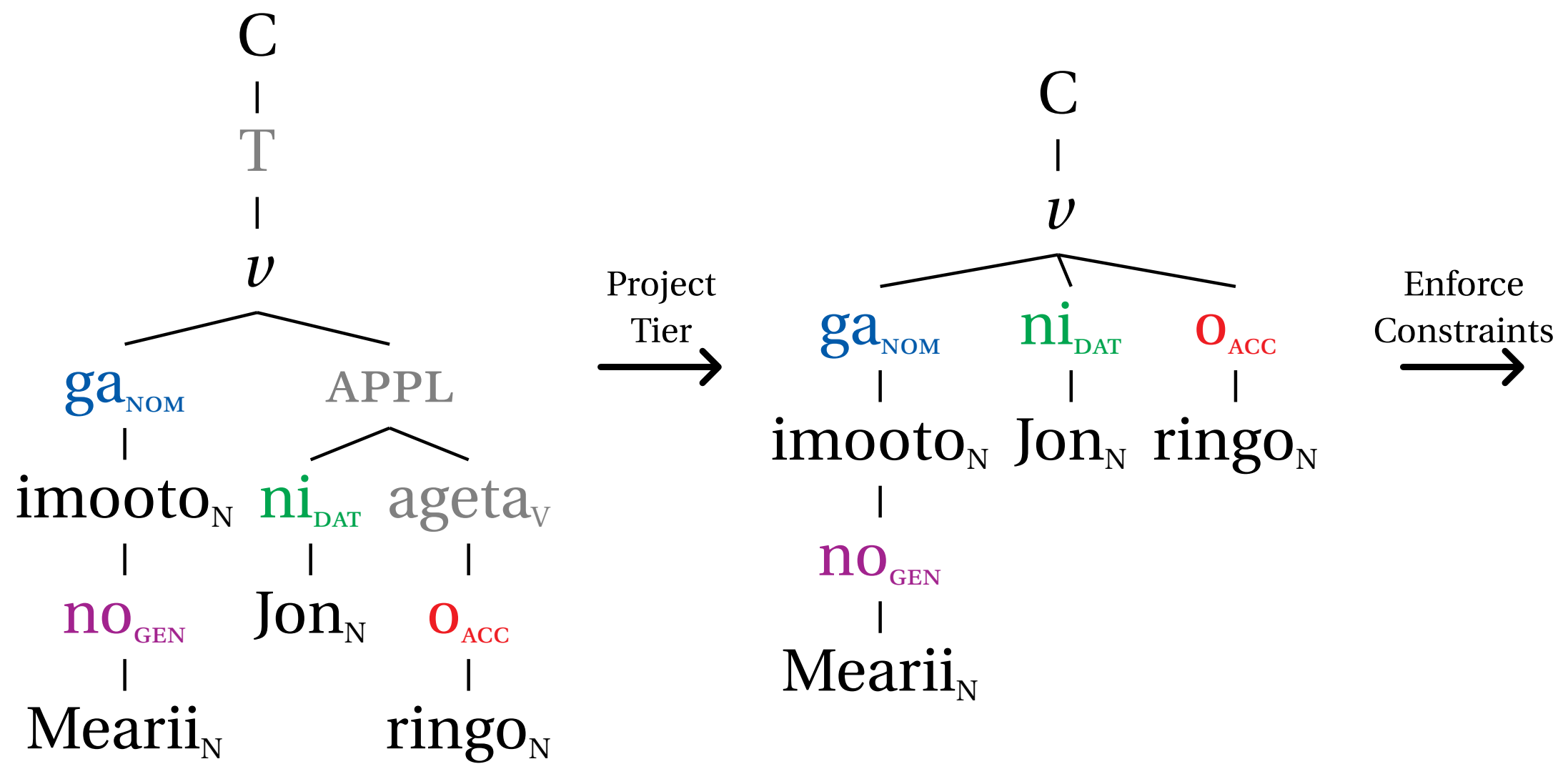
1. Delete the irrelevant items from the structure. Those that remain form a **tier projection**.
2. Each node on the tier enforces **constraints on its daughters** with a (T)SL string language.

Basic Analysis

Case tier: project all case domain nodes (C, *v*, N) and case markers (K).

Tier constraints:

- The K daughters of *v* obey the SL string language: NOM ((DAT*) ACC)
- The K daughters of N obey the SL string language: GEN*
- All other Ks are nominative

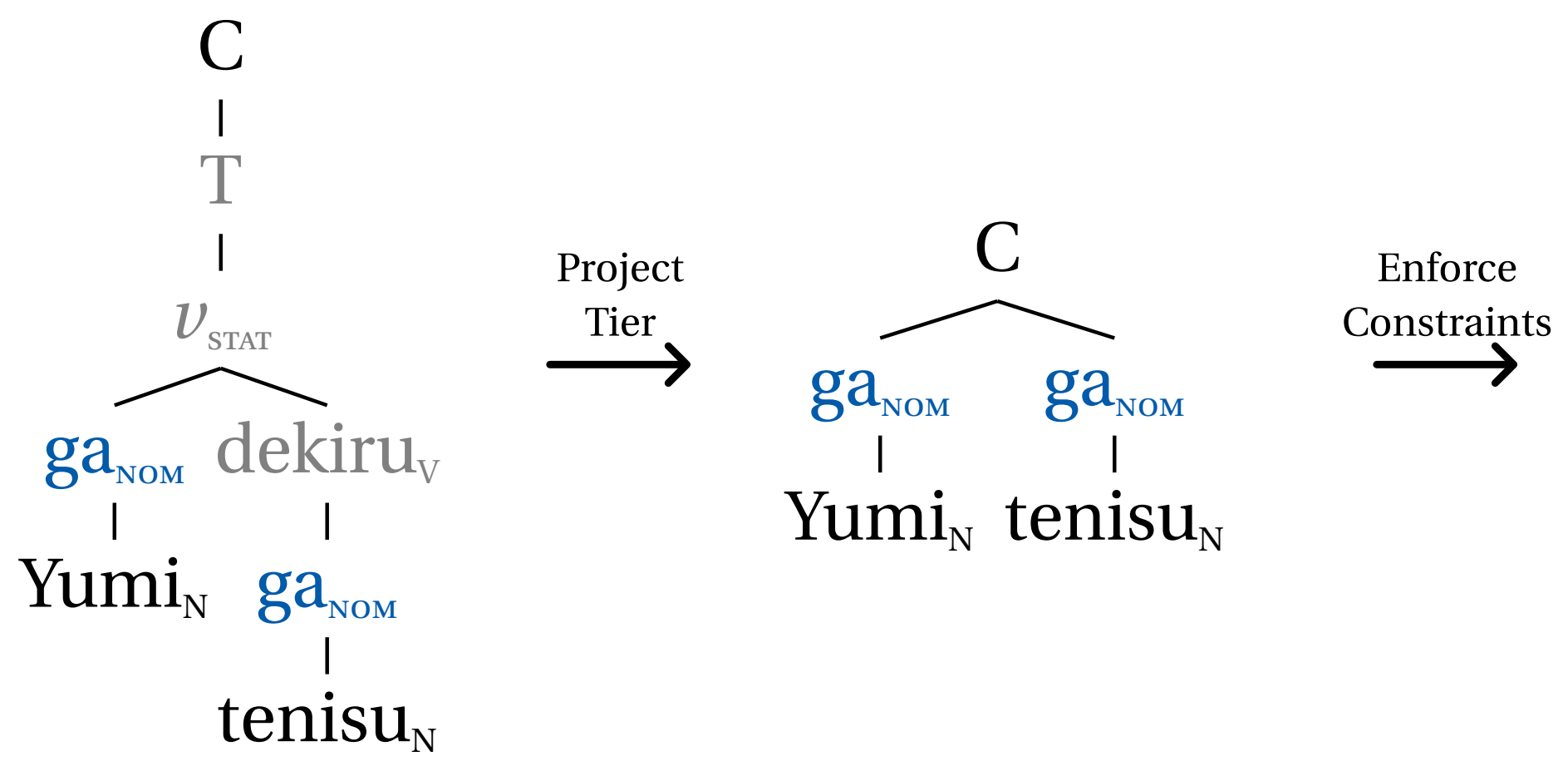


Daughters of C: ε ✓
Daughters of *v*: ga · ni · o ✓
Dtrs. of *imooto*: no ✓

Long-Distance Case Assignment

Stative Predicates

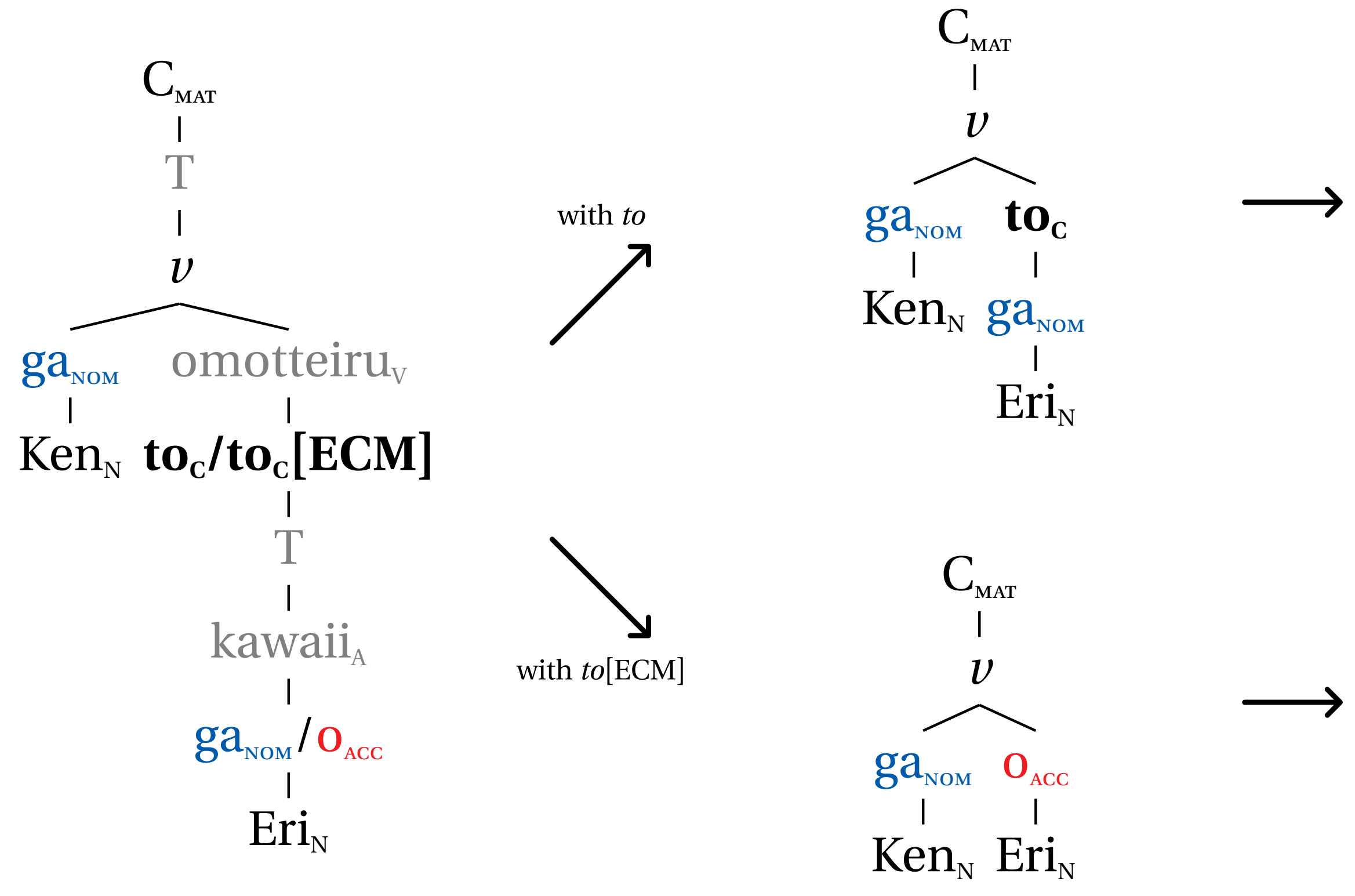
Stative *v* is not projected, so accusative case is not assigned.



Daughters of C: ga · ga ✓

Finite ECM

Predicates allowing ECM optionally select a special C head which is not projected. As a result, the case domains of the two clauses are merged.



Daughters of C$_{\text{MAT}}$: ε ✓
Daughters of *v*: ga ✓
Daughters of *to*$_{\text{C}}$: ga ✓

Daughters of C$_{\text{MAT}}$: ε ✓
Daughters of *v*: ga · o ✓

The Details

The full analysis in summary

- Three case tiers: verbal case tier (ACC/DAT), nominal case tier (GEN), and lexical case tier (lexical dative).
- Passives/causatives handled using structure-sensitive tier projection.
- Adjuncts are handled using tier projection in the daughter strings.

Lexical dative case is assigned by specific verbs to their subject/object and replaces the case that would otherwise be assigned in that position.

(6) a. Transitive verb with dative object
Taroo ga Yumi ni atta.
Taroo NOM Yumi DAT met
'Taroo met Yumi.'
b. Stative verb with dative subject (compare with Ex. 4)
Yumi ni tenisu ga dekiru.
Yumi DAT tennis NOM can.do
'Yumi can play tennis.'

Long-distance genitive assignment is similar to ECM but requires the verb to be ignored in addition to the complementizer.

(7) Ga-no conversion (Maki and Uchibori 2008)
Eri ga [Ken ga/no kita ∅] riyuu o sitteiru.
Eri NOM Ken NOM/GEN came C reason ACC know
'Eri knows the reason that Ken came.'

Passives and causatives work approximately like simplex verbs. The number of arguments predicts their cases.

(8) Causative of ditransitive
Ken ga Jin ni Yumi ni hon o agesaseta.
Ken NOM Jin DAT Yumi DAT book ACC gave.CAUS
'Ken made/let Jin give Yumi a book.'

To get all the corner cases, we use **structure-sensitive tier projection**: project only the highest verbal head and let it decide the case pattern.

Adjuncts must be ignored using tier projection in the daughter string languages. Ignoring adjuncts in the tree tiers would falsely predict that adjunct clauses share a case domain with the containing clause.

Future Work

Typology Movement has been studied fairly extensively from the TSL perspective (Graf 2022b). More work is needed on case, agreement, and interactions between all of these.

Learnability TSL languages can be learned with limited input and positive data only (Lambert et al. 2021). But we need to guess the tiers, and for syntax, we also need to infer the tree structure. There are many details to be worked out.

References and Acknowledgments

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