Developing a DGG

Recommended Steps

- There are six recommended steps for defining a grammar:

    1. Identify the initial conditions.
    2. Define a set of structure changing rules.
    3. Determine rate functions and differential equations.
    4. Define the simulation domain's geometry and topology.
    5. Set boundary conditions.
    6. Determine time scale and other parameter settings.

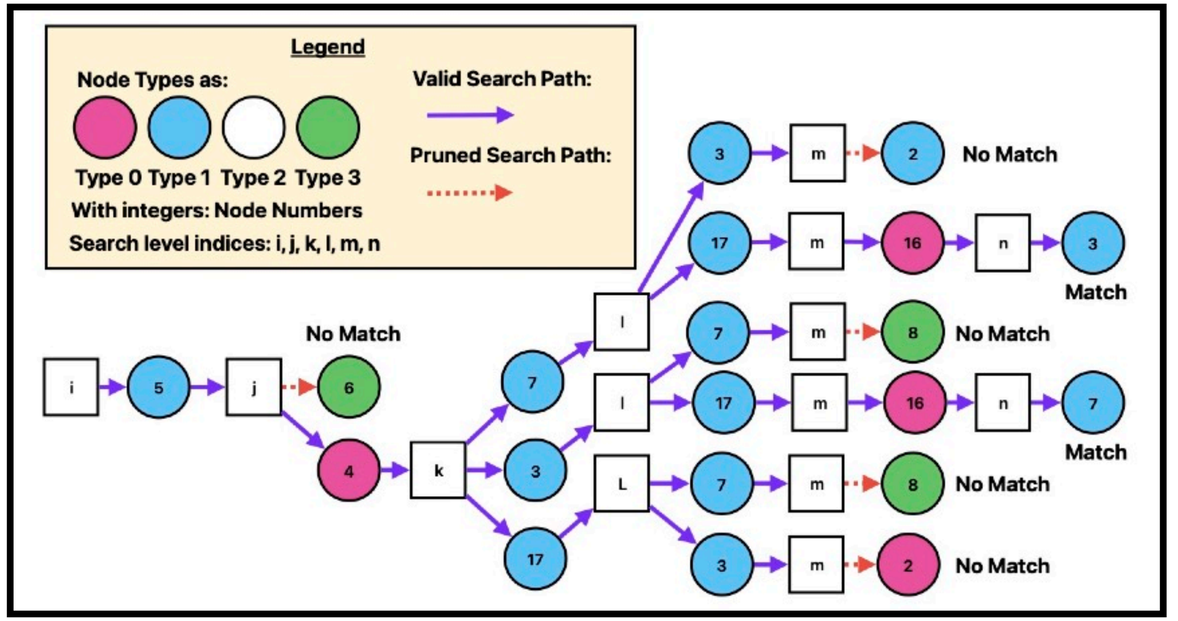
Subgraph Patern Recognition

Heuristic matching and the search space.

- Rooted search started on each node in the graph.
- A search from every nodes is required to find all automorphisms.

```
match = {∅};
for i ∈ G(V) do
    if λ_i = type 1 then
        continue;
    for j ∈ nbrs(i) do
        if λ_j = type 0 then
            continue;
        for k ∈ nbrs(j) \ {i} do
            if λ_k = type 1 then
                continue;
            for l ∈ nbrs(j) \ {i,k} do
                if λ_l = type 1 then
                    continue;
                for m ∈ nbrs(l) \ {j} do
                    if λ_m = type 0 then
                        continue;
                    for n ∈ nbrs(j) \ {i,k,l} do
                        if λ_n = type 1 then
                            continue;
                        match.append(i,j,k,l,m,n);
```

Search Algorithm



Sample Search Tree

Sources: (Medwedeff and Mjolsness, 2023)