

# Simple Tree Data Structure

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```
>> ST{1}

ans =

struct with fields:

    t: [1×105 double]
  beta0: [3×105 double]
    T0: 105
    K: 28
  beta: {1×28 cell}
    T: [60 29 31 27 19 23 30 27 19 15 27 18 21 18 24 23 26 17 20 19 15 17 15 12 8 8 6 7]
   tk: [1×28 double]
    d: 3
```

Fields in ST structure:

- **t**: Vector of length **T0** giving the current parameterization of the main branch. Typically this is initialized with something like `linspace(0,1,T0)`.
- **beta0**: A  $d \times T0$  matrix giving the main branch curve. The  $i^{\text{th}}$  column, `beta0(:,i)`, gives the coordinates in  $\mathbb{R}^d$  of  $\beta_0(t)$  at  $t$  given by `t(i)`.
- **T0**: The number of points in the discretization of the main branch.
- **K**: The number of side branches.
- **beta**: A  $1 \times K$  cell array of matrices representing the  $K$  side branch curves. The  $k^{\text{th}}$  matrix, `beta{k}`, is a  $d \times T(k)$  matrix giving the points in the discretization of  $\beta_k$ .
- **T**: A vector of  $K$  integers where `T(k)` gives the number of points in the discretization of  $\beta_k$ .
- **tk**: A vector of length  $K$ , giving the starting points of the side branches in terms of their parameter values along the main branch. That is, if `tk(k)` is  $t_k$ , then  $\beta_0(t_k) = \beta_k(0)$ .
- **d**: The number of spatial dimensions in which the tree lies, typically equal to 3.