

# Table of contents for “Towards reliable quantification of cell state velocities”

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### Introduction

### Methods

Dynamical inference

The time scale over which average cell state velocities are reported

Scale invariance of gene-wise velocity components

First approach:  $\kappa$ -velo

Second approach: eco-velo

Visualisation

Nyström projection (velocity visualisation for  $\kappa$ -velo)

Visualisation for eco-velo

Processing

Processing pipeline of  $\kappa$ -velo

Processing pipeline of eco-velo

Overview of the workflow for  $\kappa$ -velo and eco-velo

Simulation data

Real data

### Results

PCA and Nyström projection faithfully represent the high-dimensional velocity vectors

$\kappa$ -velo recovers simulated velocities

Careful processing prevents introduction of artefacts

$\kappa$ -velo explains cell state plasticities and speed of transcriptional change in pancreas endocrinogenesis

$\kappa$ -velo recovers multiple differentiation paths in hematopoietic system

Eco-velo approximates cell state velocities using minimal data processing and computation

Computational efficiency of the methods

Data and software availability

### Discussion

### Supporting information

### References