High-order Solution Transfer between Curved Meshes and Ill-conditioned Bézier Curve Intersection

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Outline

1. Introduction and motivation
2. Solution Transfer
3. Compensated Evaluation
4. Modified Newton's for Intersection

Introduction and motivation

A Work in Two Parts: Solution Transfer

- Lagrangian Methods
- Remeshing / rezoning
- Mesh adaptivity
- Multiphysics
- Conservation
- Curved and / or High-order

Method of Characteristics

To solve the simple transport equation

$$u_t + cu_x = 0, \quad u(x,0) = u_0(x).$$

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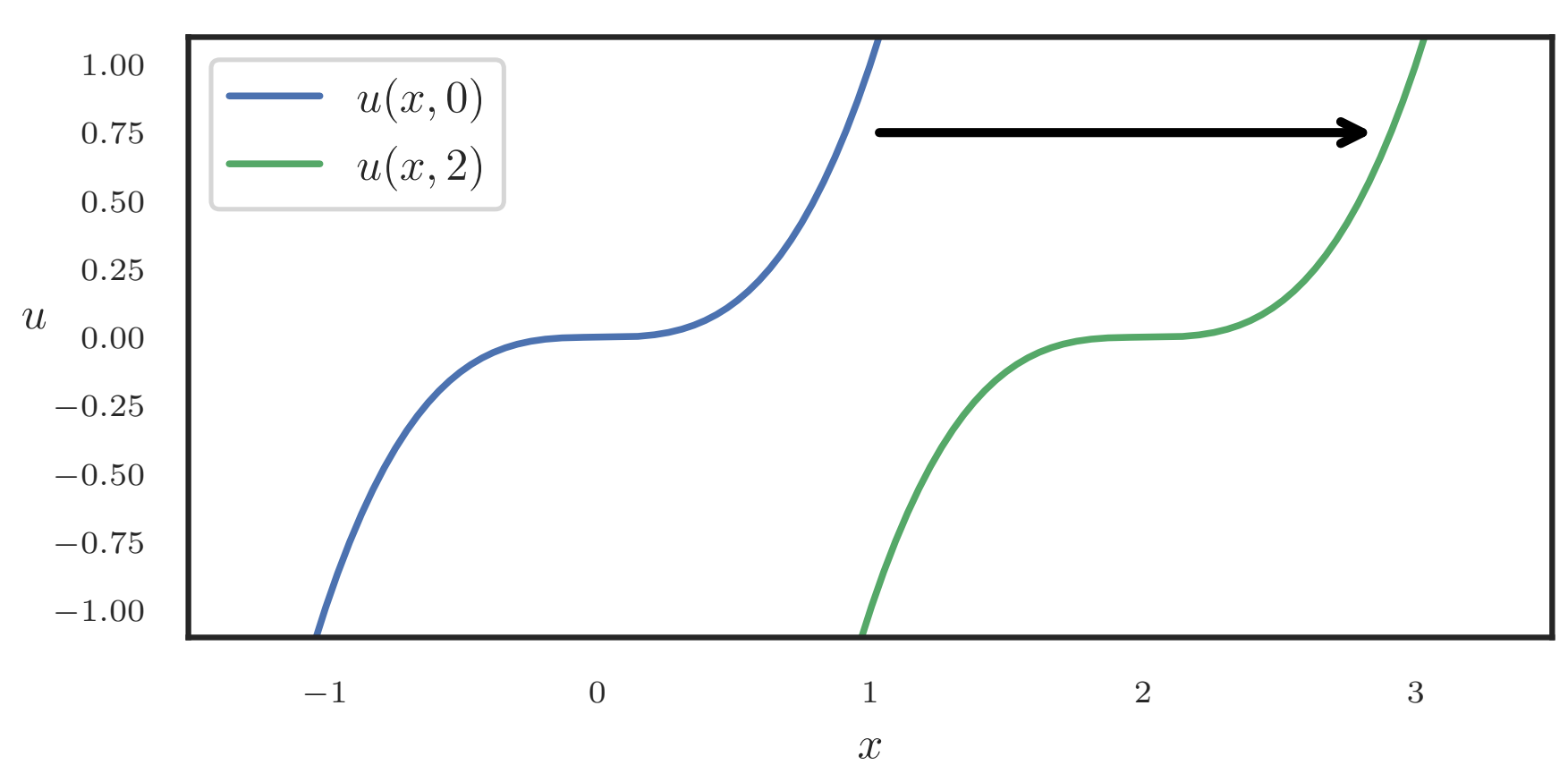
and the PDE becomes a (trivial) ODE

$$\frac{d}{dt}u(x(t),t) = 0.$$

Method of Characteristics



A Work in Two Parts: Ill-conditioned Bézier

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Images Needed

Side-by-side of triangle vs. curved element that is visibly not convex.

Images Needed

Side-by-side of triangle intersection vs. curved element intersection that splits into two parts.