Test Results for Mesh Hydro Code

This computer

Contents

1 Advection

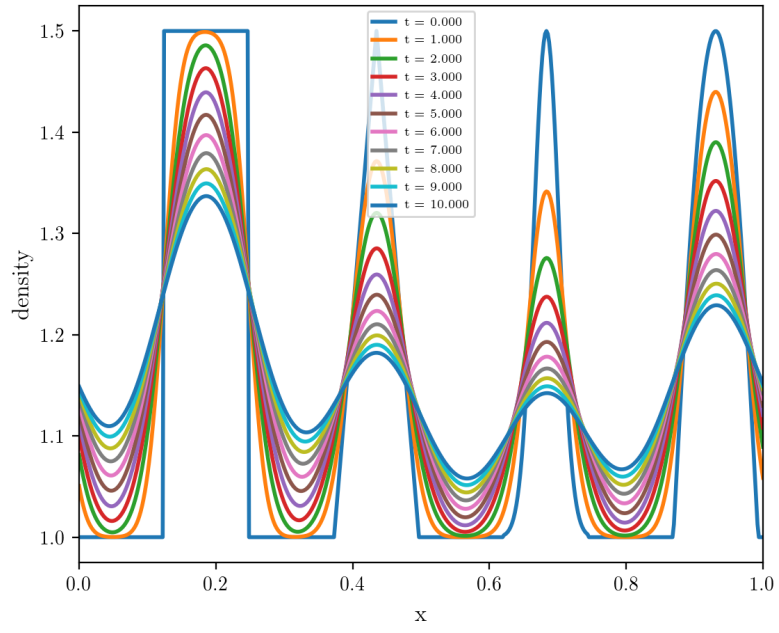## 1.1 Piecewise Constant

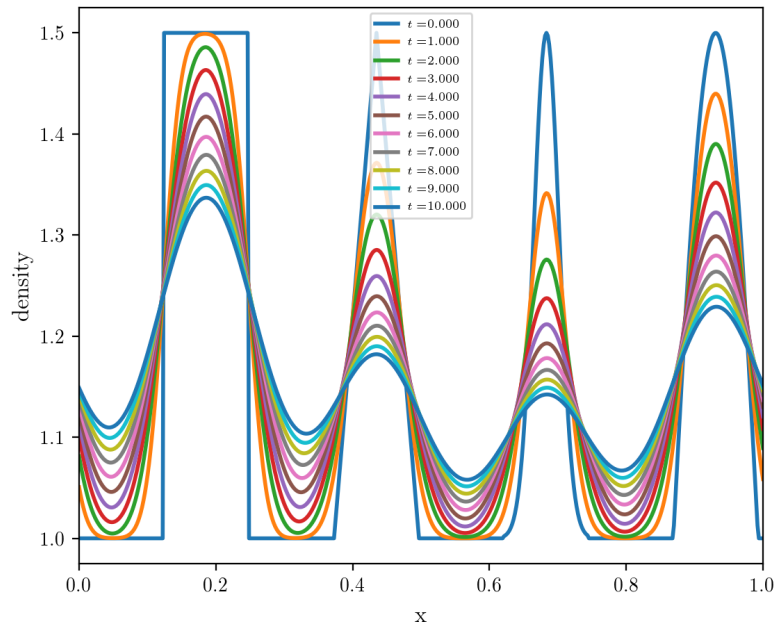**Figure 1:** Expected result 1D
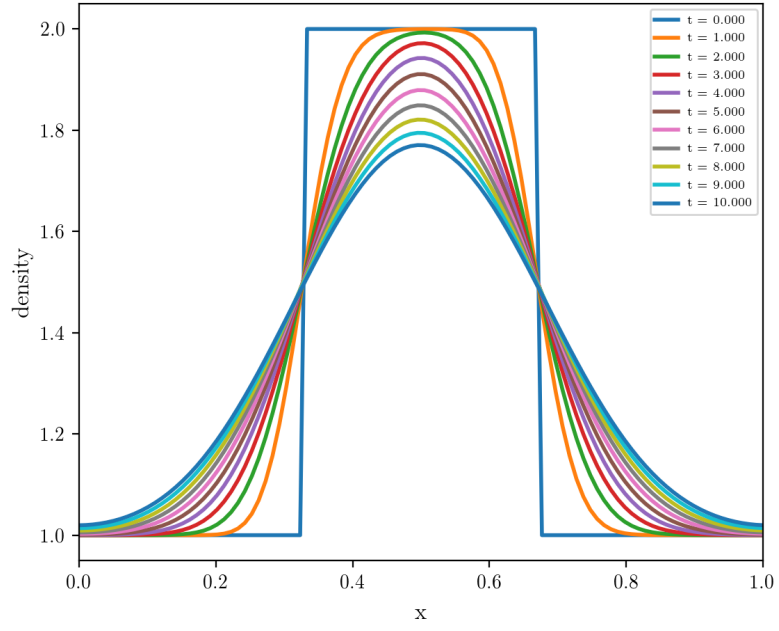

Figure 2: Obtained result 1D

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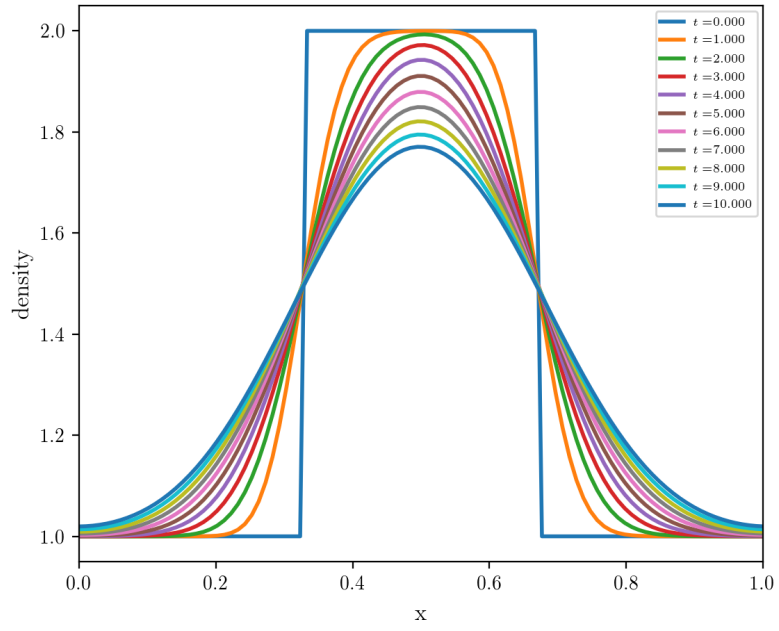**Figure 3:** Expected result 1D negative velocity

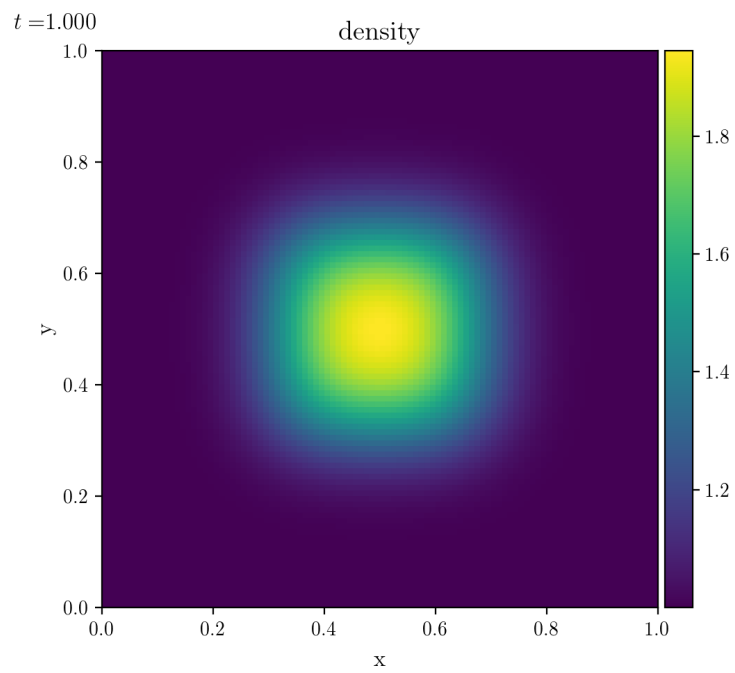**Figure 4:** Obtained result 1D negative velocity
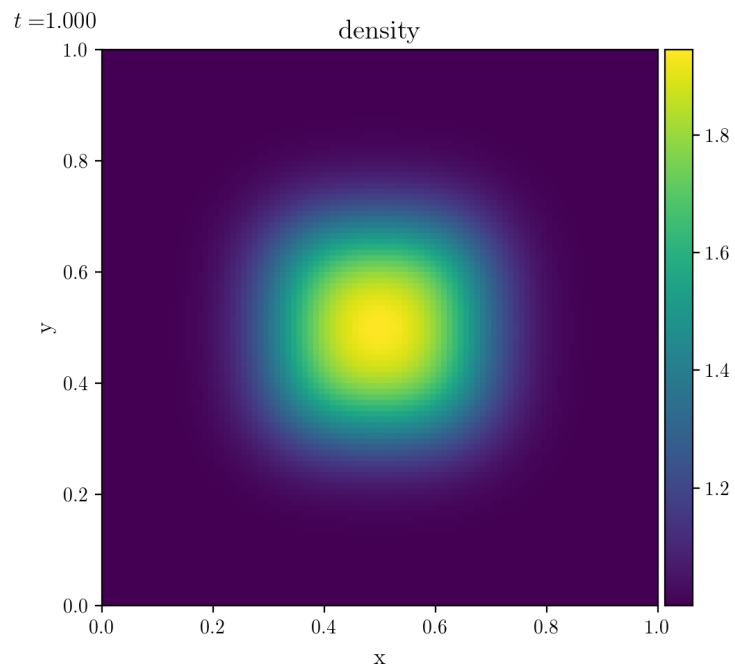
Figure 5: Expected result 2D
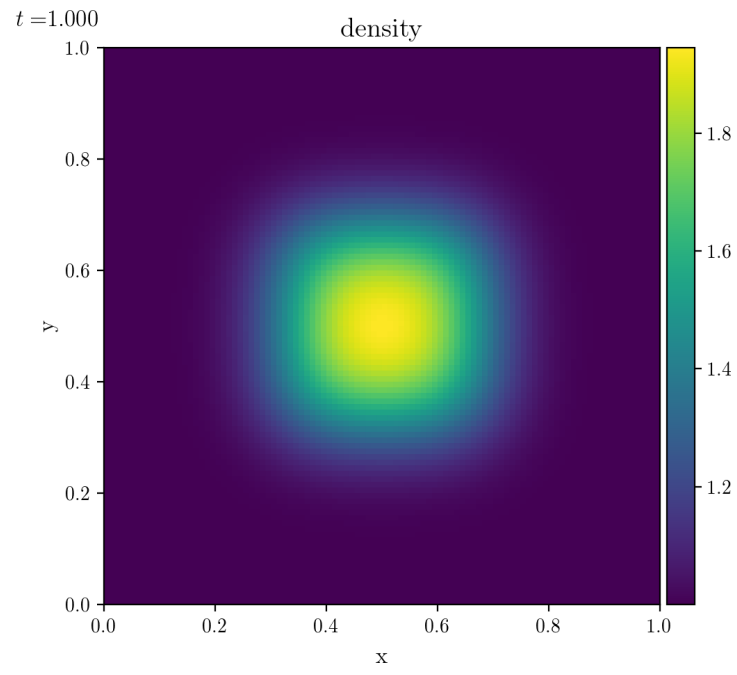

Figure 6: Obtained result 2D

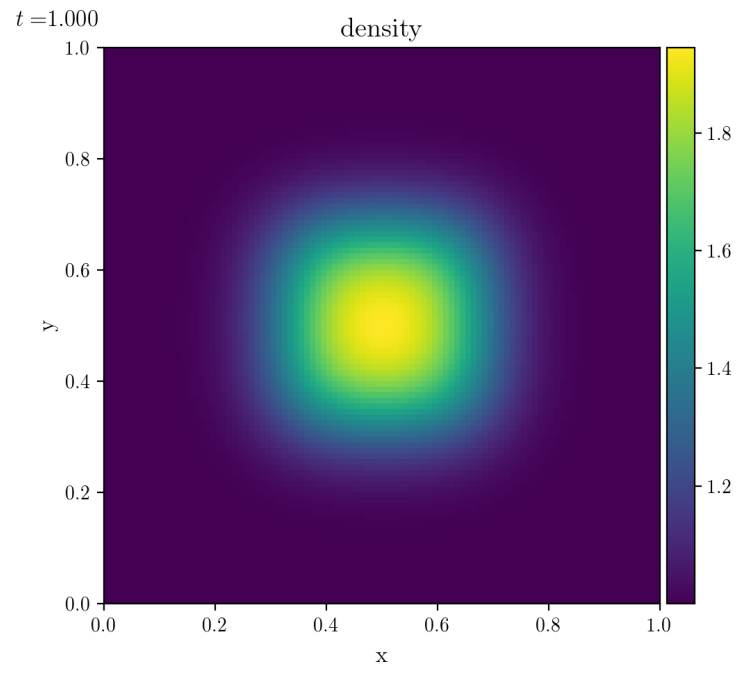**Figure 7:** Expected result 2D negative velocity

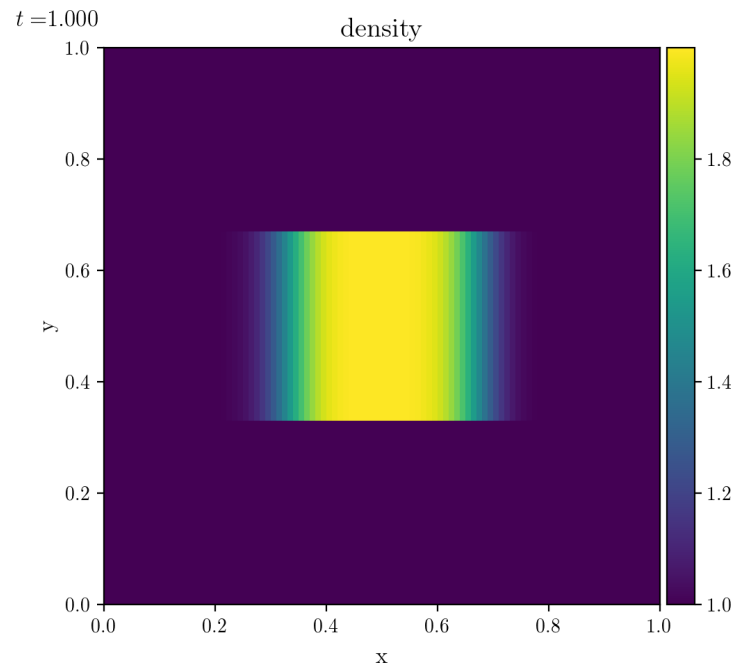**Figure 8:** Obtained result 2D negative velocity

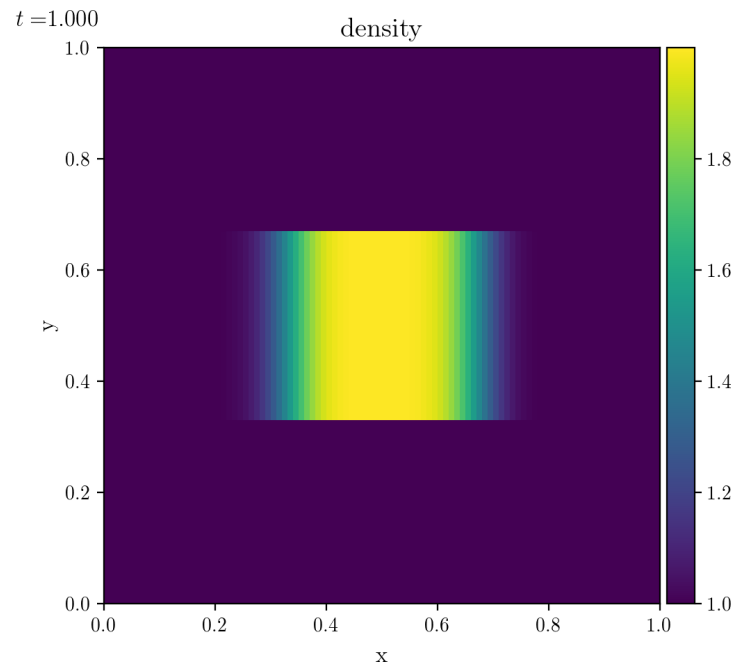**Figure 9:** Expected result 2D velocity in x direction only

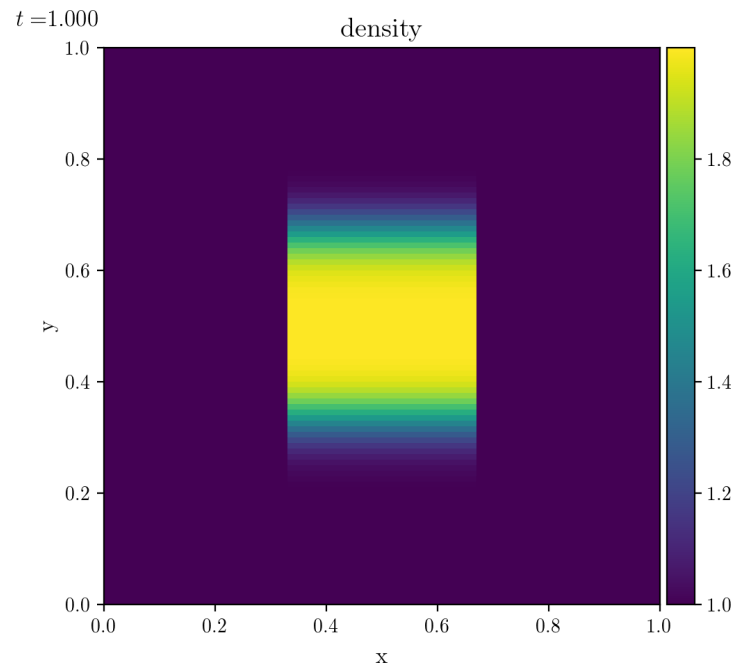

Figure 10: Obtained result 2D velocity in x direction only

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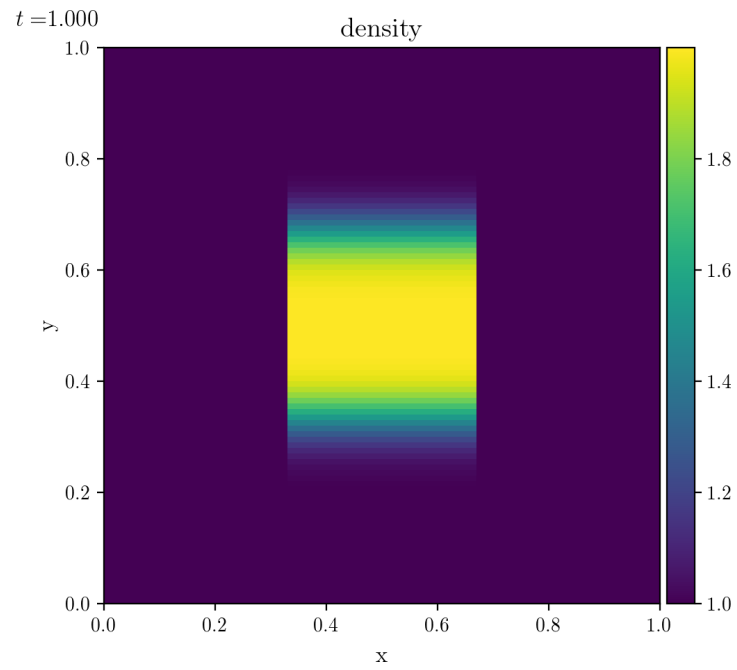**Figure 11:** Expected result 2D velocity in y direction only

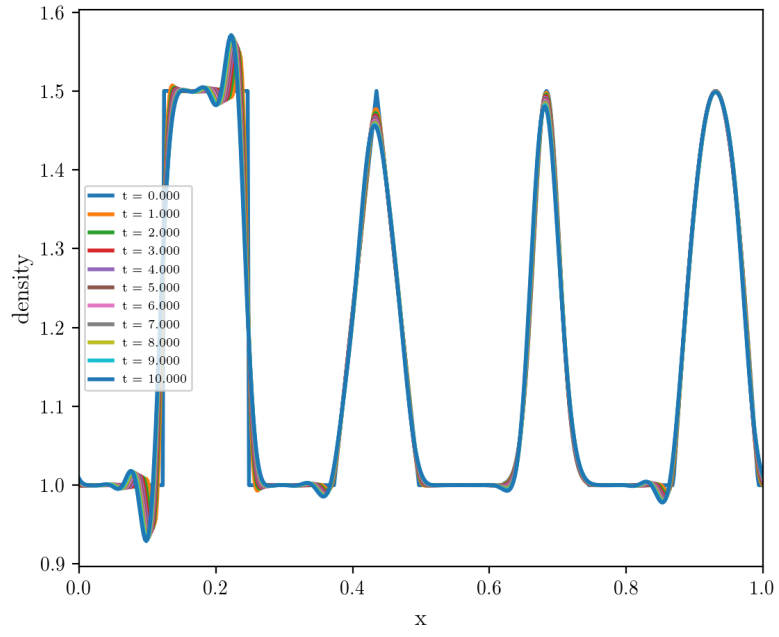**Figure 12:** Obtained result 2D velocity in y direction only

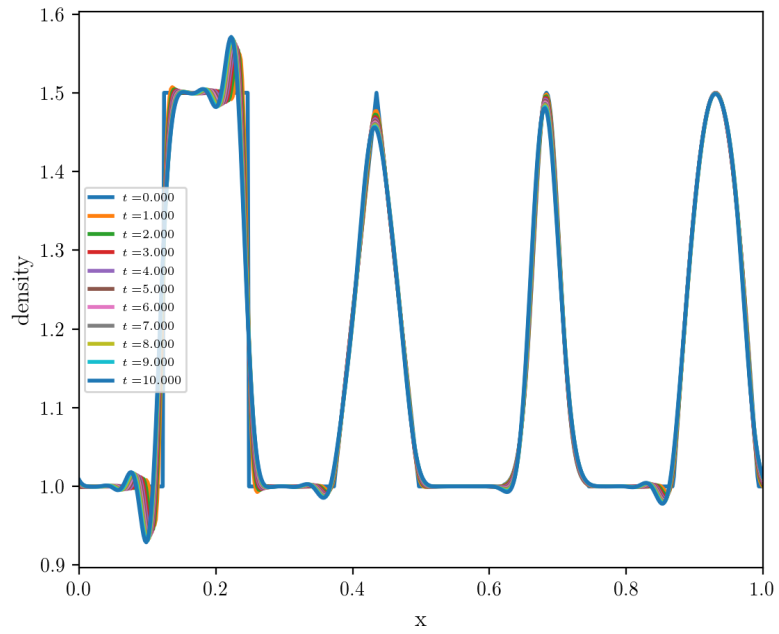## 1.2 Piecewise Linear

Figure 13: Expected result 1D

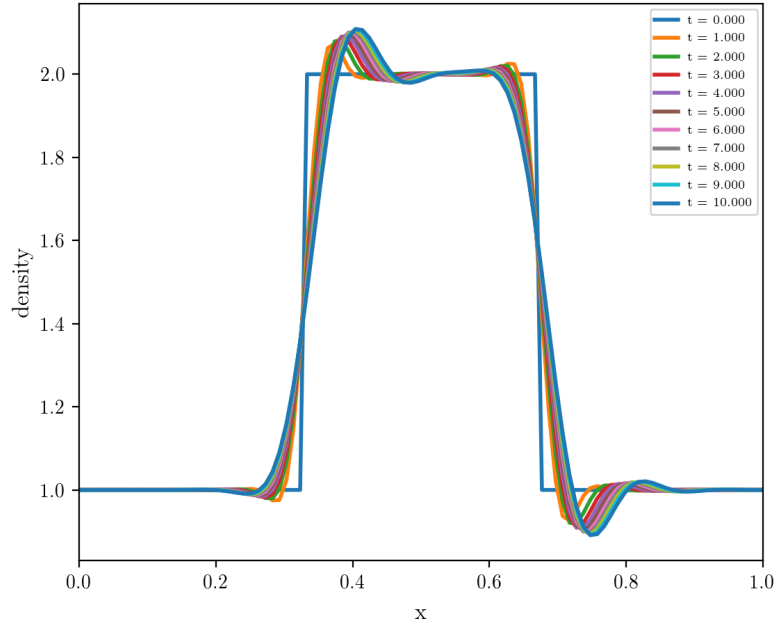**Figure 14:** Obtained result 1D

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Figure 15: Expected result 1D negative velocity

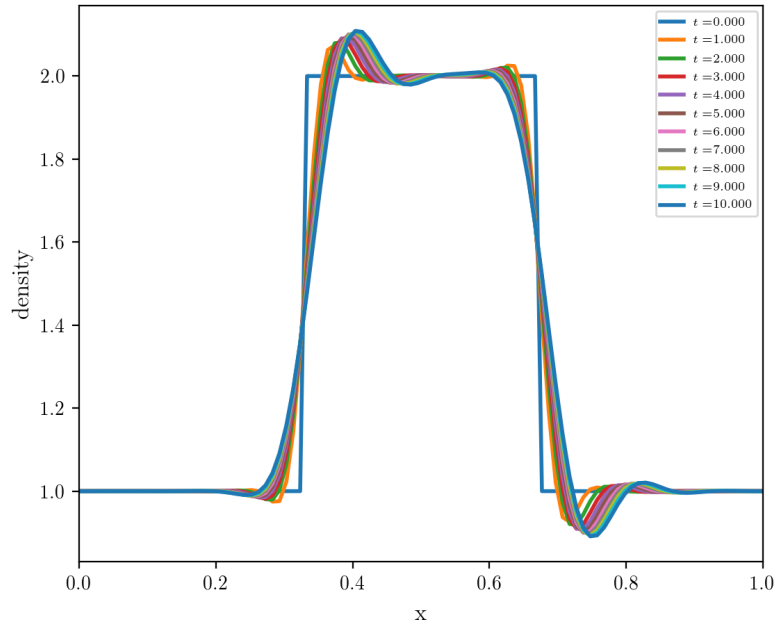**Figure 16:** Obtained result 1D negative velocity
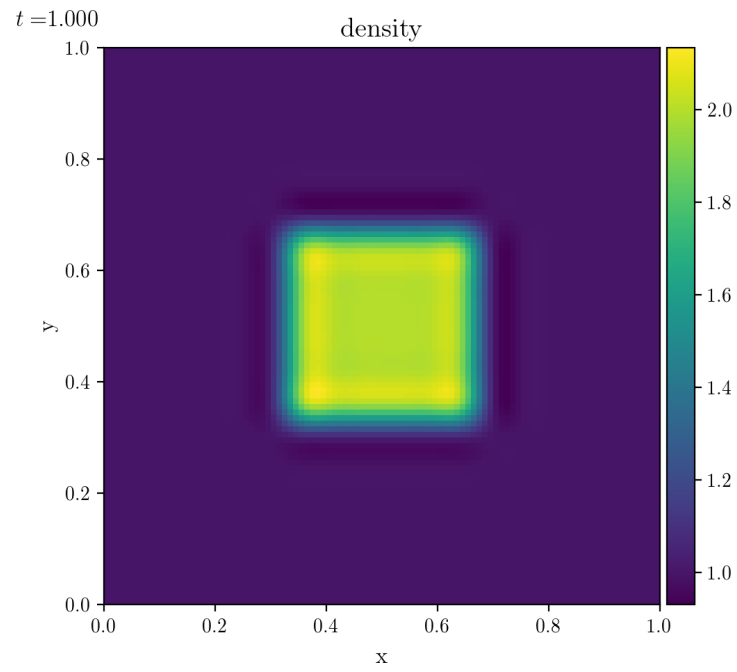
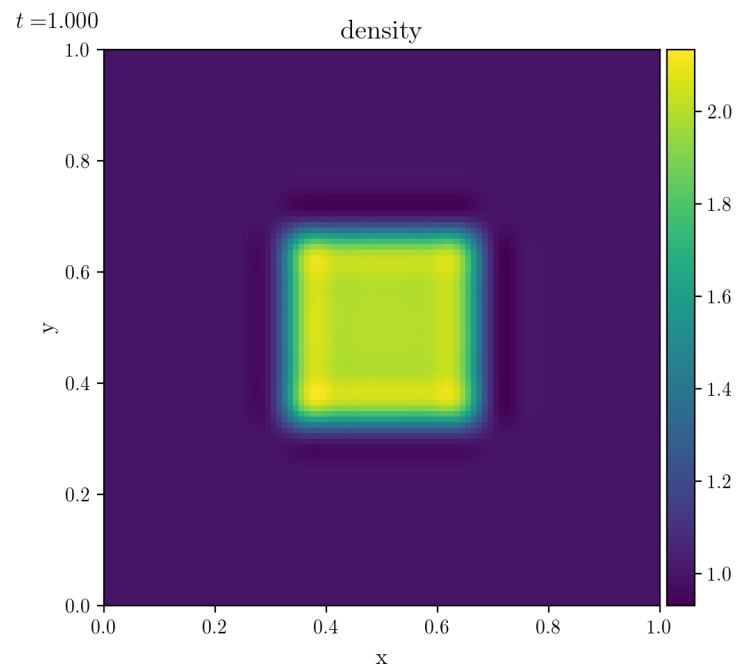**Figure 17:** Expected result 2D
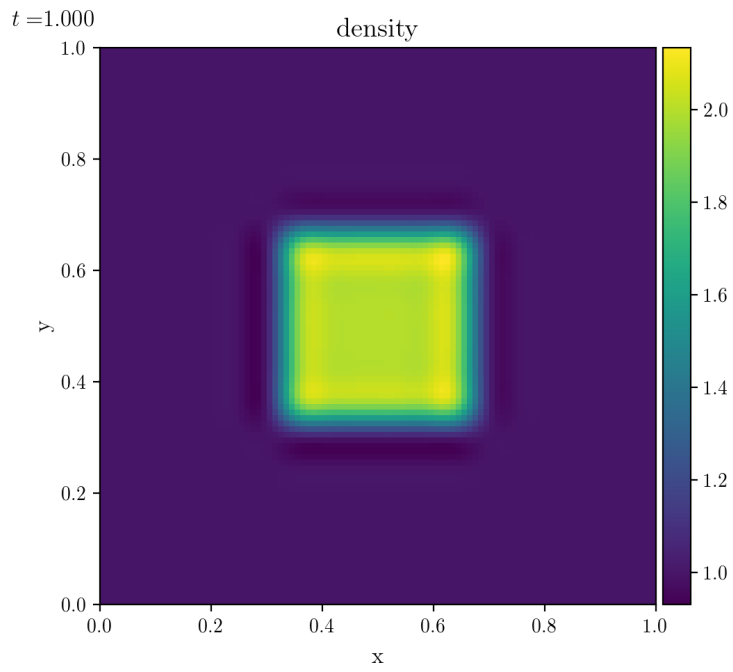

Figure 18: Obtained result 2D

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Figure 19: Expected result 2D negative velocity

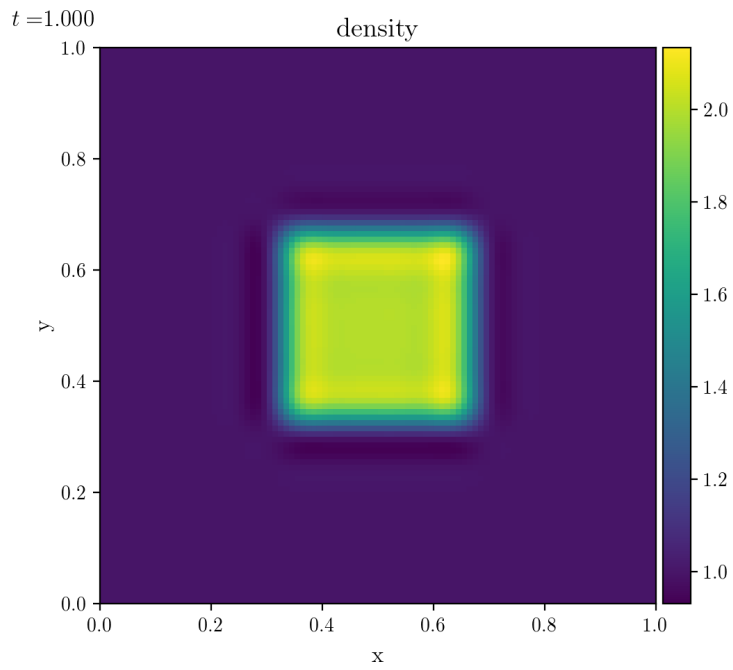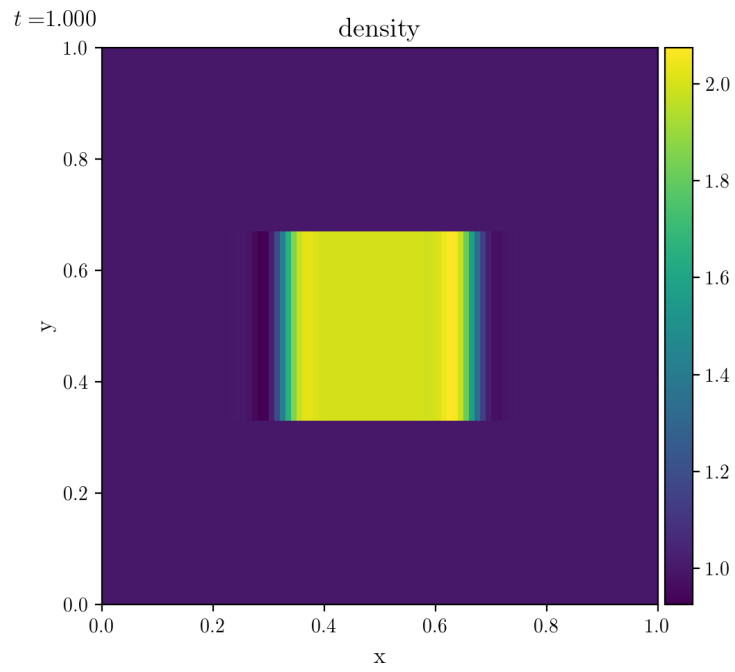**Figure 20:** Obtained result 2D negative velocity

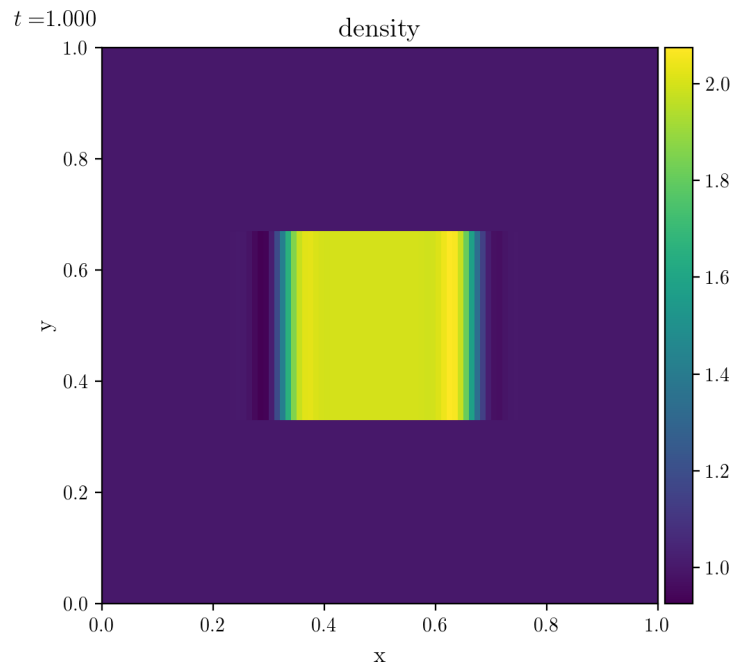**Figure 21:** Expected result 2D velocity in x direction only

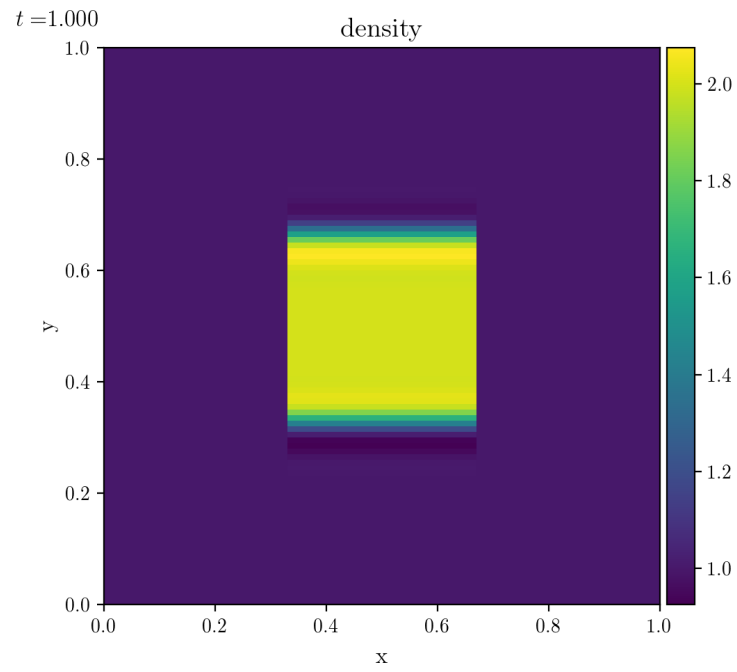**Figure 22:** Obtained result 2D velocity in x direction only

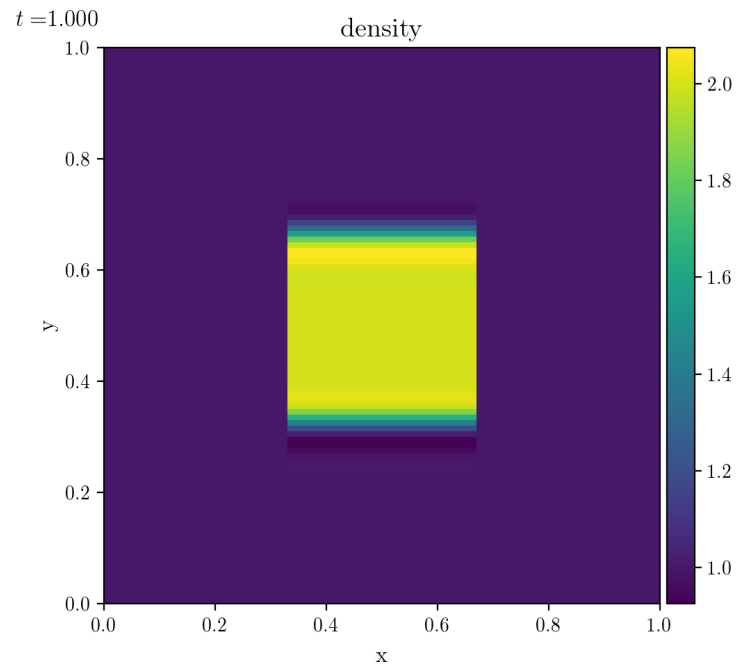**Figure 23:** Expected result 2D velocity in y direction only

Figure 24: Obtained result 2D velocity in y direction only

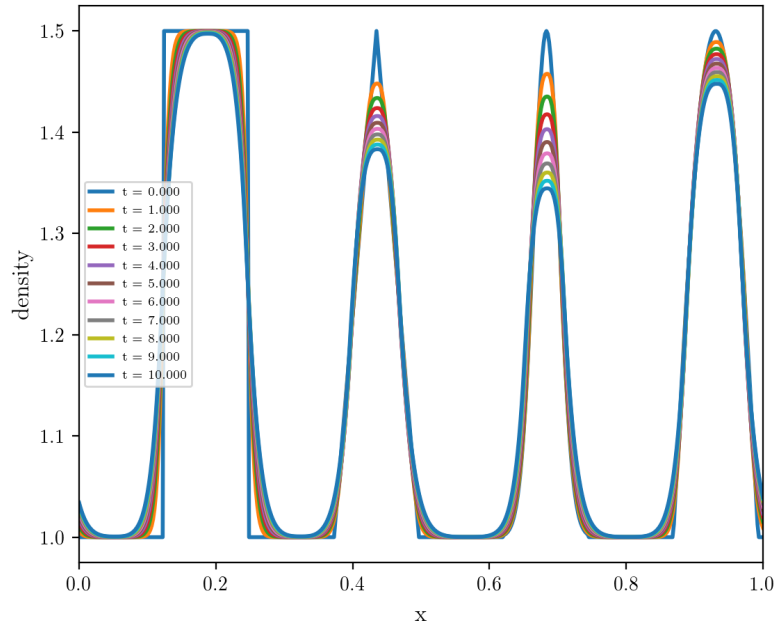## 1.3 Piecewise Linear with Slope Limiters
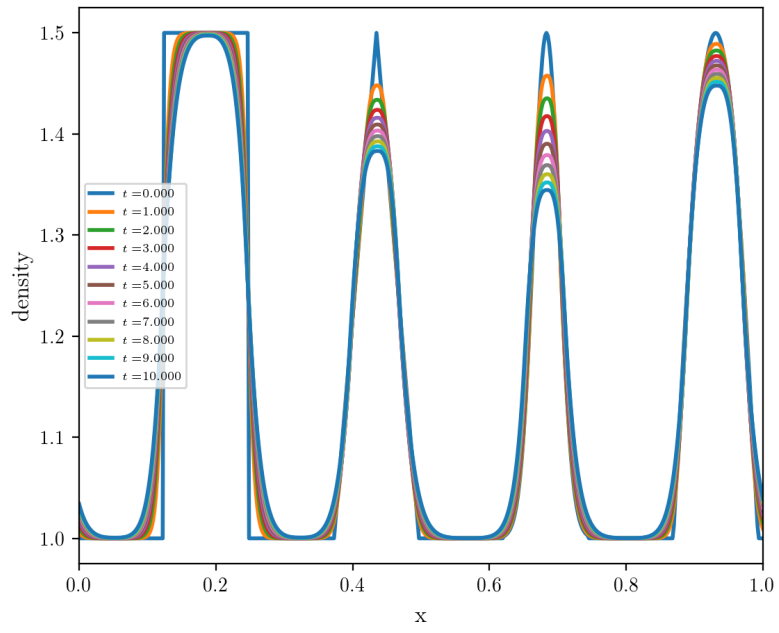
Figure 25: Minmod Slope Limiter. Expected result 1D

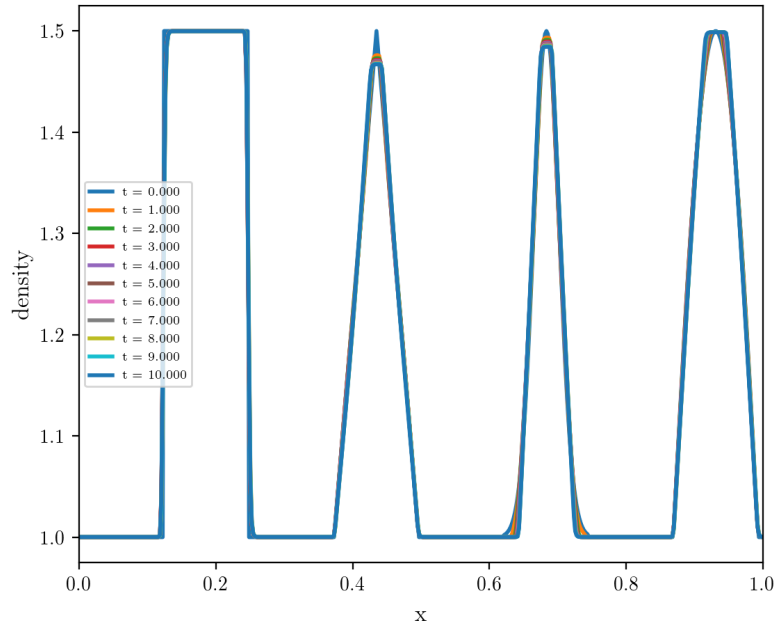**Figure 26:** Minmod Slope Limiter. Obtained result 1D

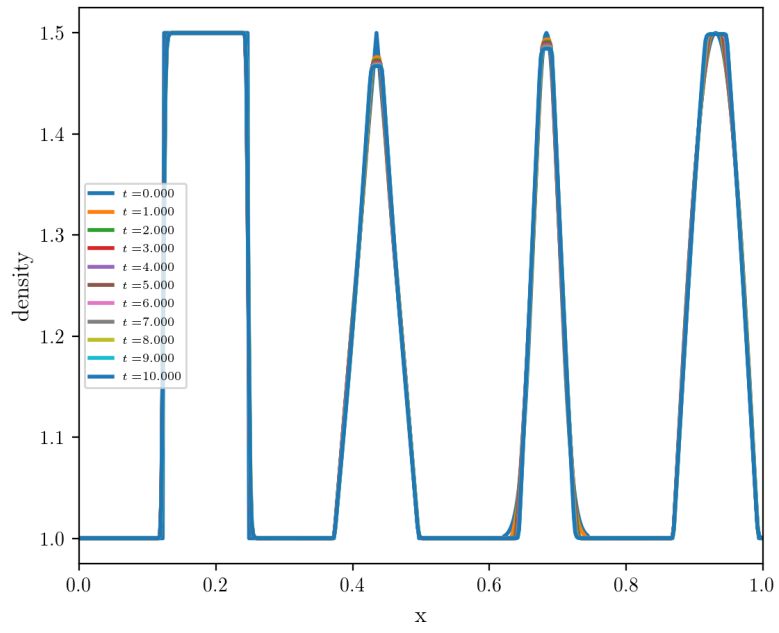**Figure 27:** Superbee slope limiter. Expected result 1D negative velocity

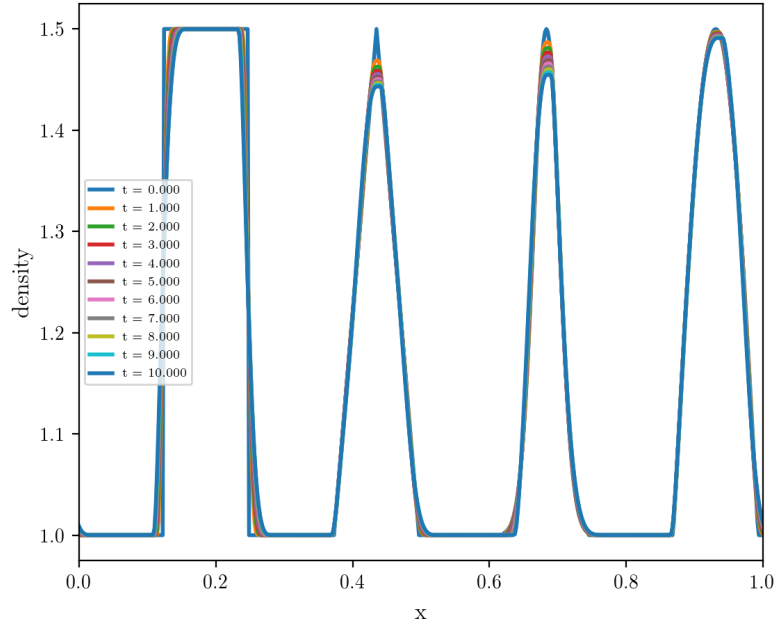**Figure 28:** Superbee slope limiter. Obtained result 1D negative velocity

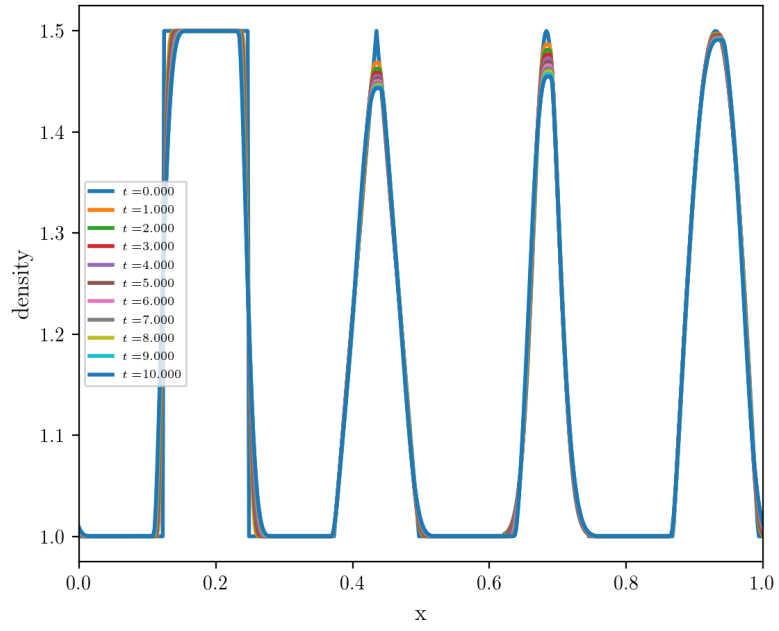**Figure 29:** Monotonized central limiter. Expected result 1D

Figure 30: Monotonized central limiter. Obtained result 1D
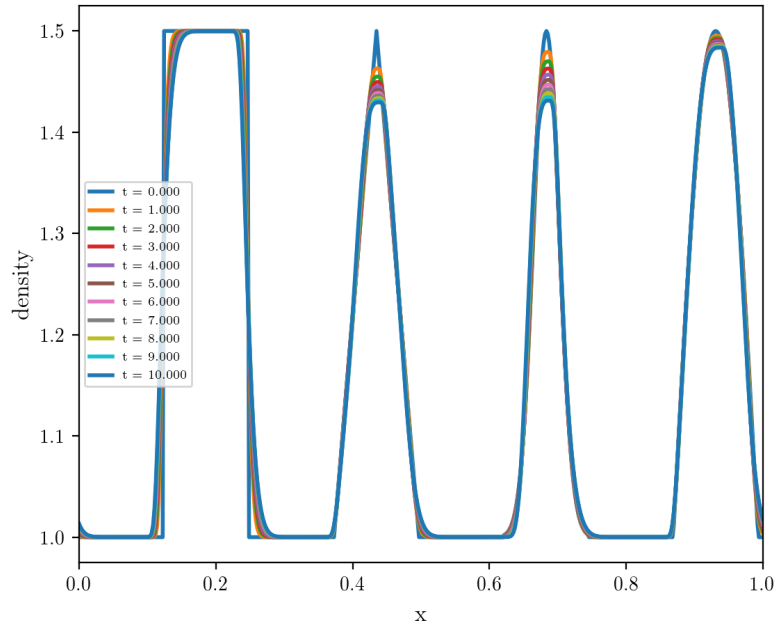
Figure 31: Van Leer Limiter. Expected result 1D
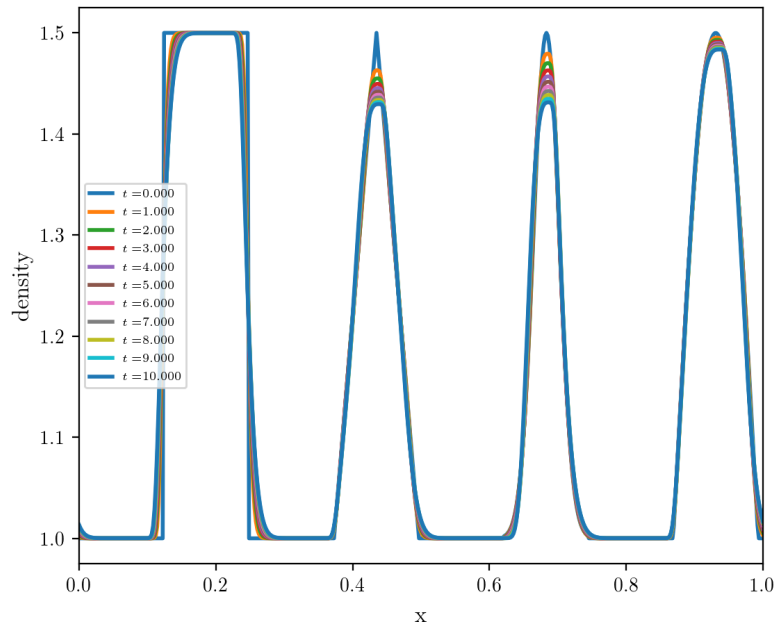

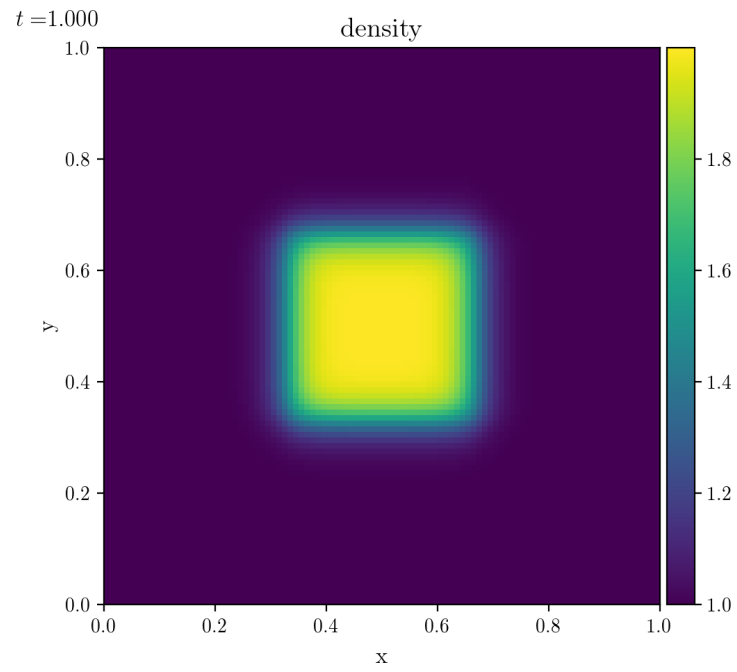**Figure 32:** Van Leer Limiter. Obtained result 1D

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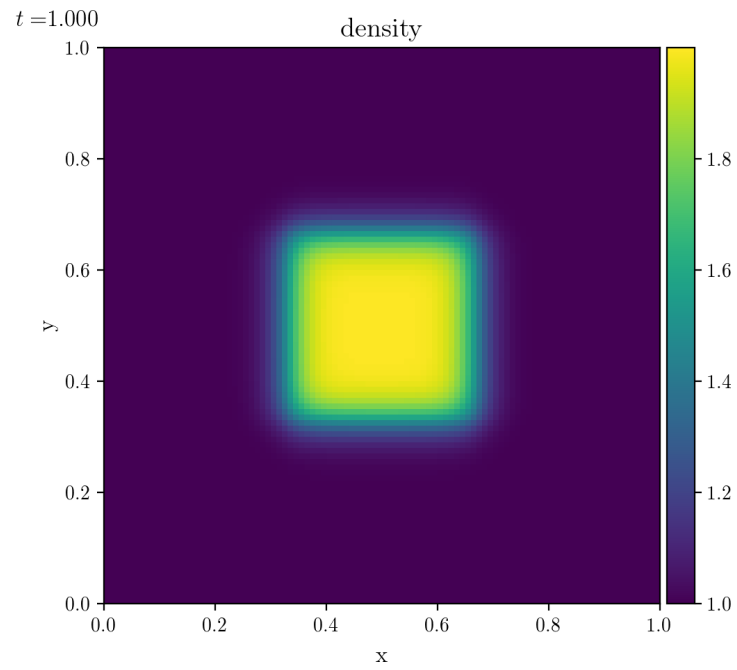**Figure 33:** Minmod Slope Limiter. Expected result 2D

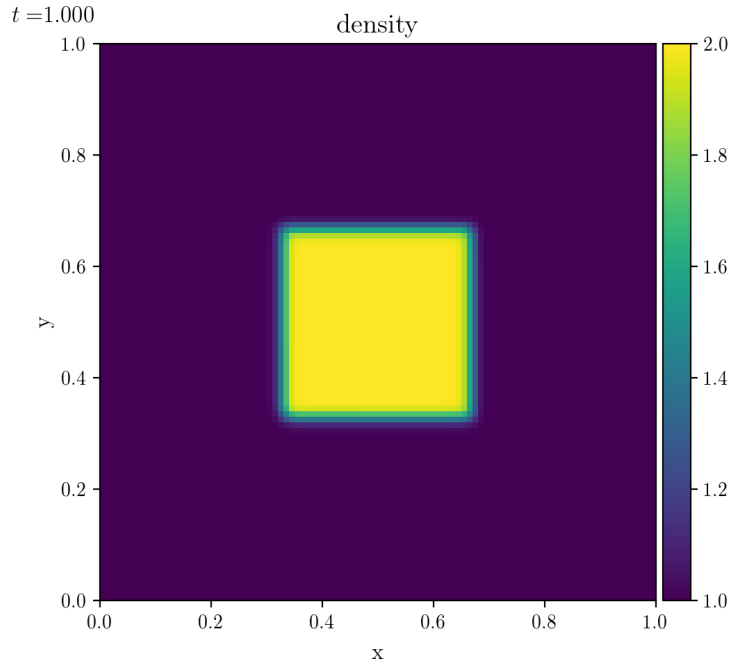**Figure 34:** Minmod Slope Limiter. Obtained result 2D

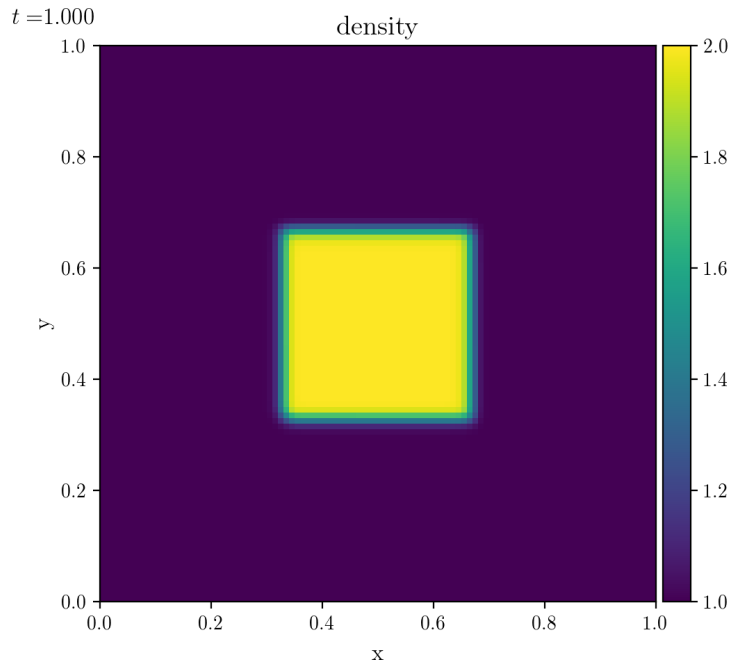**Figure 35:** Superbee slope limiter. Expected result 2D negative velocity

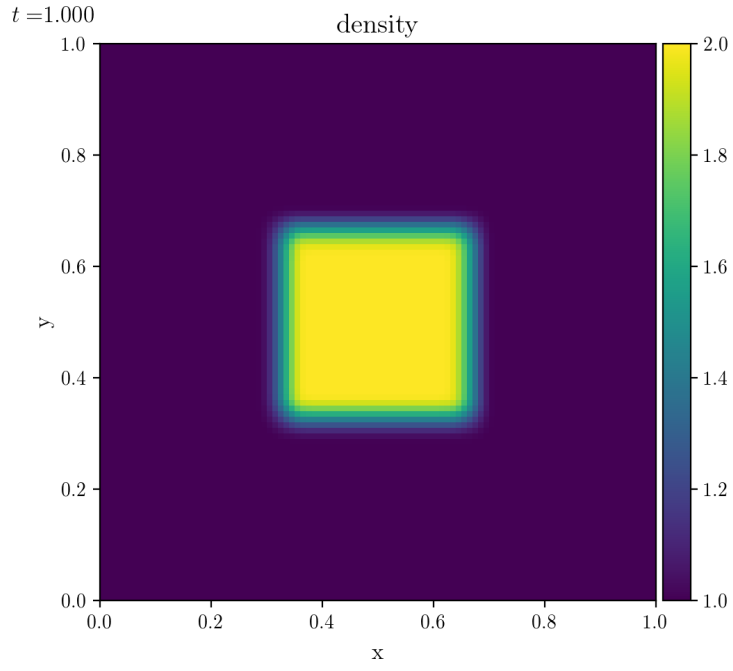**Figure 36:** Superbee slope limiter. Obtained result 2D negative velocity

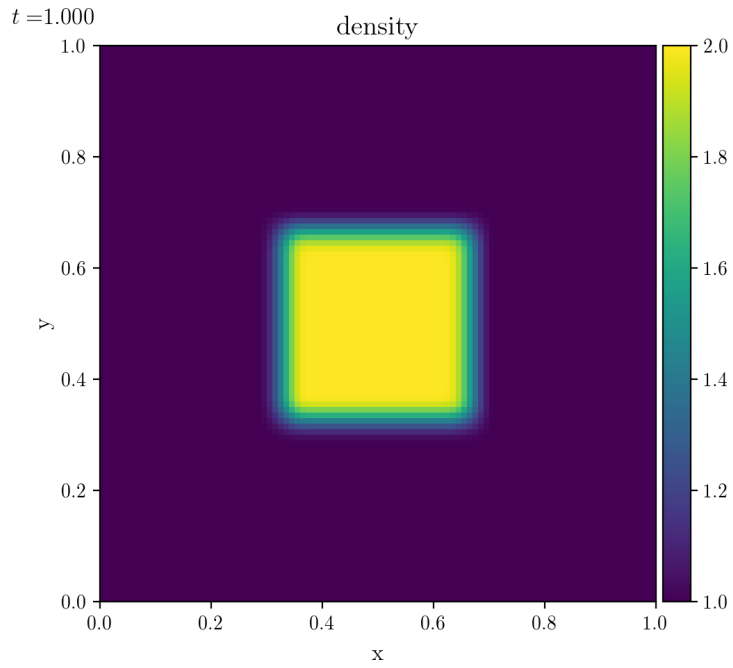**Figure 37:** Monotonized central limiter. Expected result 2D

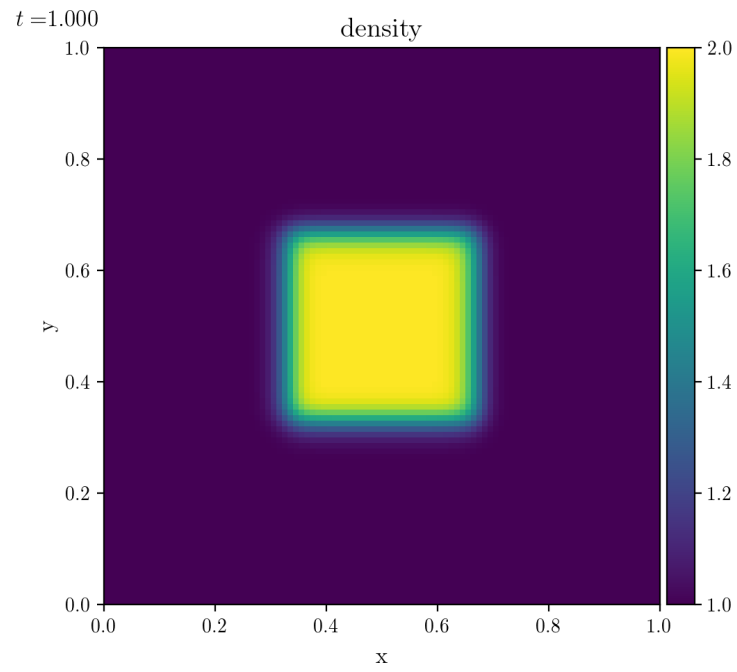**Figure 38:** Monotonized central limiter. Obtained result 2D

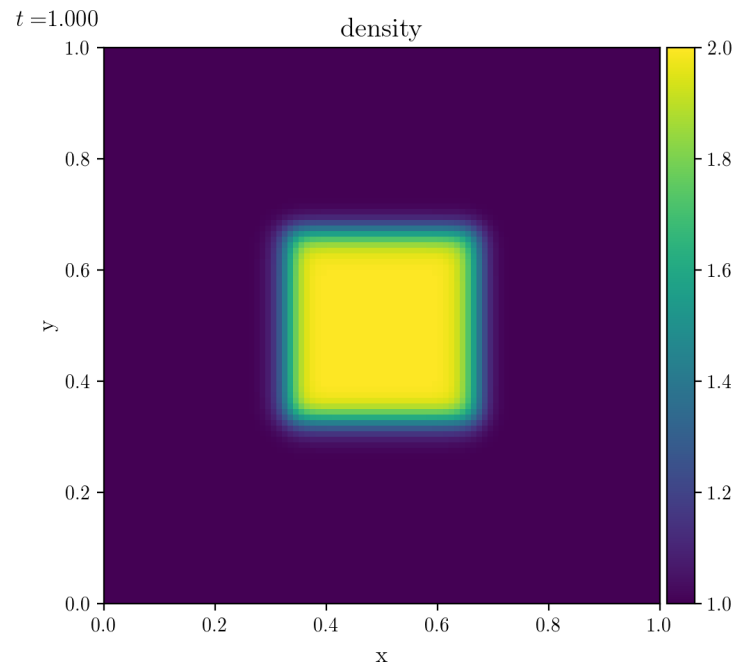**Figure 39:** Van Leer Limiter. Expected result 2D

Figure 40: Van Leer Limiter. Obtained result 2D
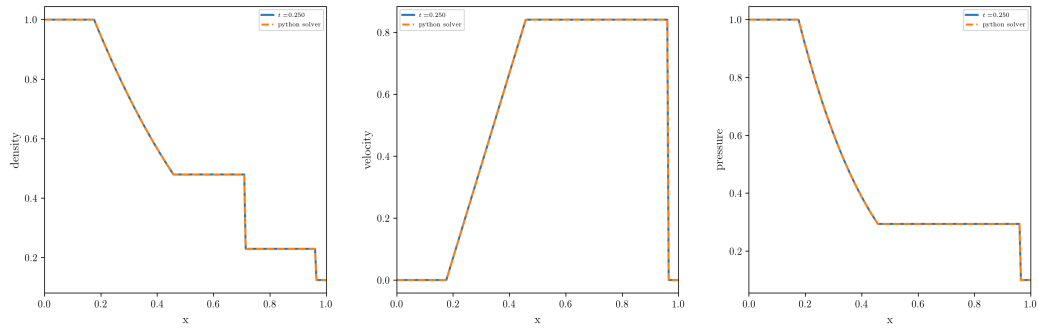
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2 Riemann Solvers

2.1 Exact vs Python

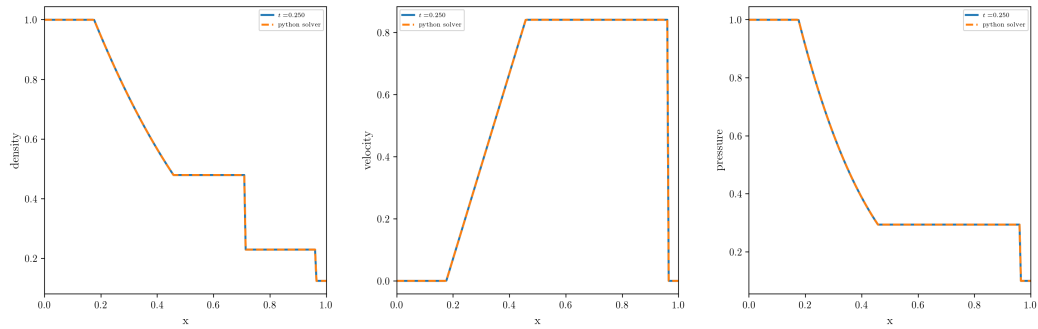**Figure 41:** Exact solver for (right facing) sod shock. Expected result.

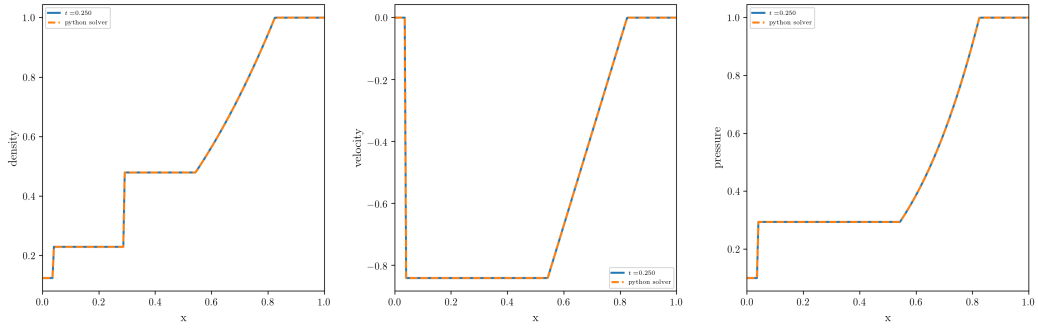**Figure 42:** Exact solver for (right facing) sod shock. Obtained result.

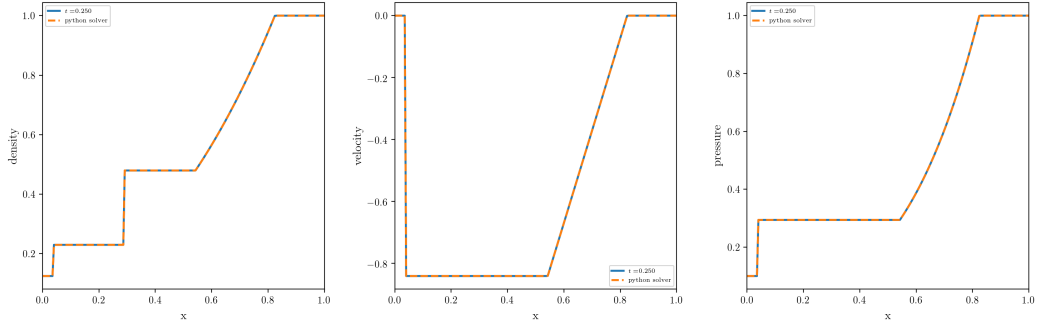**Figure 43:** Exact solver for (left facing) sod shock. Expected result.

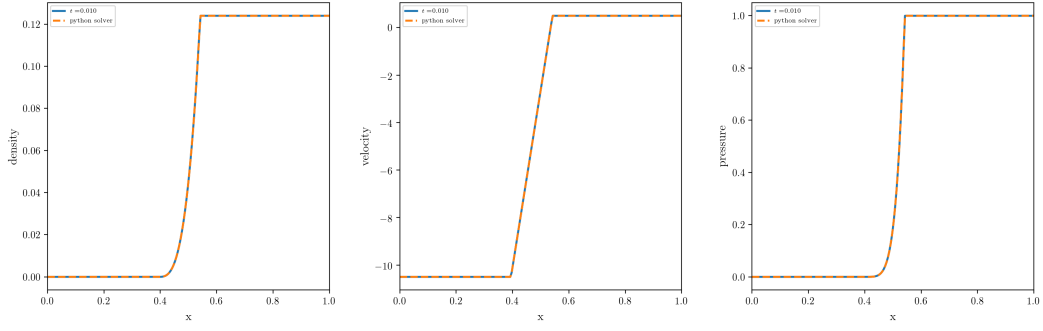**Figure 44:** Exact solver for (left facing) sod shock. Obtained result.

2.1.1 Vacuum

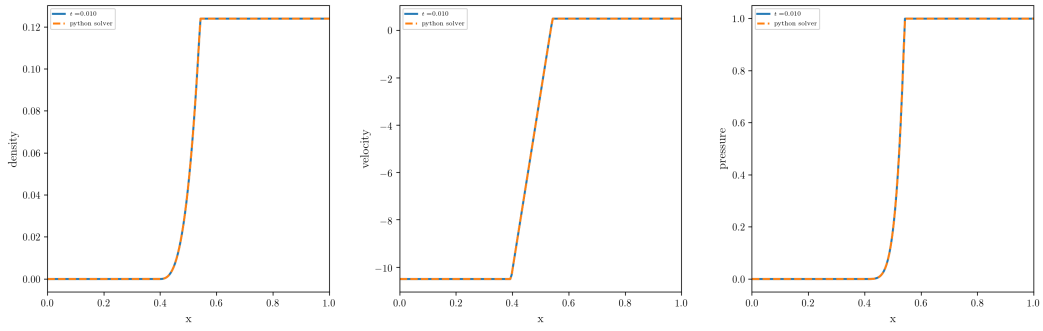**Figure 45:** Exact solver for left vacuum state. Expected result.

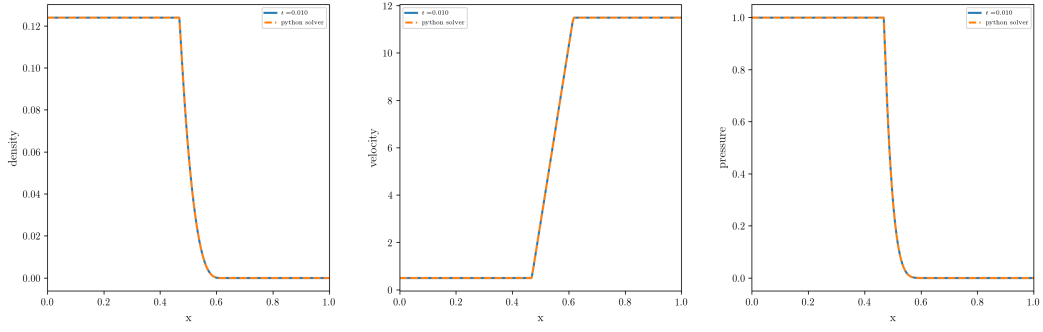**Figure 46:** Exact solver for left vacuum state. Obtained result.

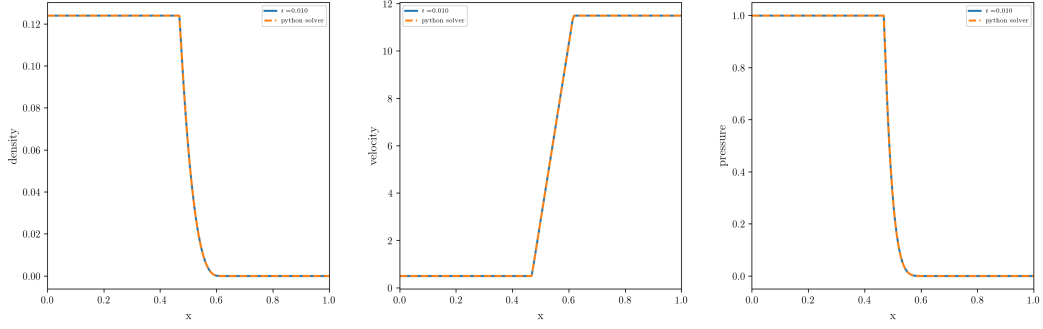**Figure 47:** Exact solver for left vacuum state. Expected result.

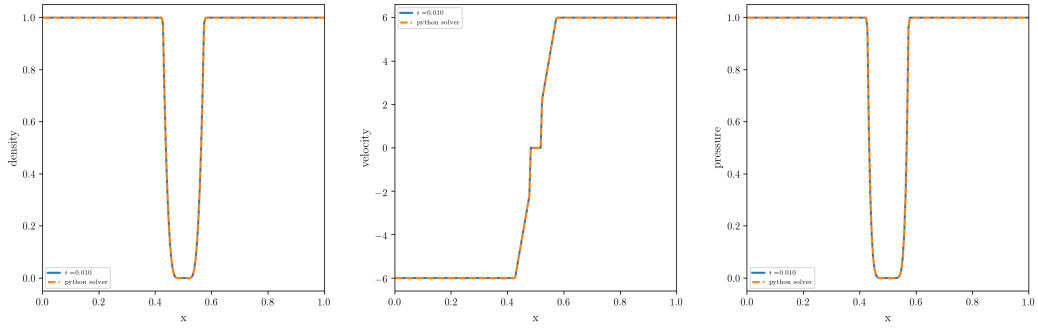**Figure 48:** Exact solver for left vacuum state. Obtained result.

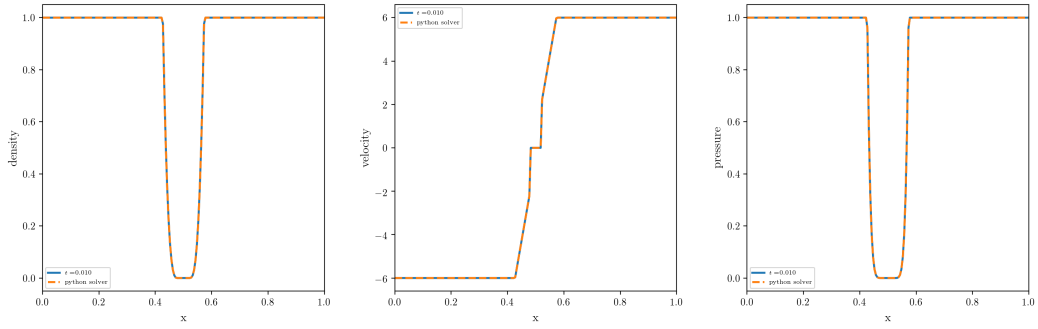**Figure 49:** Exact solver for vacuum generating conditions. Expected result.

Figure 50: Exact solver for vacuum generating conditions. Obtained result.