**Colombo, Rinaldo M.; Guerra, Graziano; Holle, Yannick**  
*Non conservative products in fluid dynamics.* (English) [Zbl 0748.8978]  
Nonlinear Anal., Real World Appl. 66, Article ID 103539, 27 p. (2022)

Summary: Fluid flow in pipes with discontinuous cross section or with kinks is described through balance laws with a non conservative product in the source. At jump discontinuities in the pipes' geometry, the physics of the problem suggests how to single out a solution. On this basis, we present a definition of solution for a general **BV** geometry and prove an existence result, consistent with a limiting procedure from piecewise constant geometries. In the case of a smoothly curved pipe we thus justify the appearance of the curvature in the source term of the linear momentum equation.

These results are obtained as consequences of a general existence result devoted to abstract balance laws with non conservative source terms in the non resonant case.

**MSC:**

- 35L65 Hyperbolic conservation laws  
- 35L67 Shocks and singularities for hyperbolic equations  
- 76N15 Gas dynamics (general theory)  
- 76N10 Existence, uniqueness, and regularity theory for compressible fluids and gas dynamics  
- 35L60 First-order nonlinear hyperbolic equations

**Keywords:**

- fluid flows in pipes; non conservative products in balance laws; balance laws with measure source term

**Full Text:** DOI

**References:**

[3] Boutin, Benjamin; Coquel, Frédéric; LeFloch, Philippe G., Coupling techniques for nonlinear hyperbolic equations. II. Resonant interfaces with internal structure, Netw. Heterog. Media, 16, 2, 283-315 (2021), 1427153 · Zbl 1469.35141  


[16] Colombo, Rinaldo M.; Marcellini, Francesca, Coupling conditions for the \((3 \times 3\)) Euler system, Netw. Heterog. Media, 5, 4, 675-690 (2010), Zbl 1284.35328


This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.