Contribution ID: **31** Type: **Poster**

A higher dimensional perspective on composite gas flow simulations in pipeline networks

Tuesday 18 February 2025 15:30 (1h 15m)

Accurate simulations of gas flow within pipeline networks provide crucial insights for transmission and design operators. This importance intensifies with the growing integration of hydrogen-blended fuels in hydrogen-based energy systems. Existing models predominantly address single-component, one-dimensional flow within individual pipe segments, interconnected at network junctions. Recently, composite flow models within pipes, frequently employing mixture fraction methods, have garnered significant attention. These methods utilize a segregated approach to flow and composite transport, albeit within the limitations of one-dimensional modeling. Physically, hydrogen's low molecular weight can lead to complex and non-intuitive flow dynamics and advection patterns in blended gas mixtures which may not reflect in 1D models. Exploring higher-dimensional models can offer a more comprehensive understanding of the underlying physics. The talk focuses on developing 2D and 3D pipe flow models for composite gases, explore coupling frameworks and numerical discretizations for networks.

Primary authors: NAYAK, Ashwin (CSC group); GRUNDEL, Sara; BENNER, Peter

Presenter: NAYAK, Ashwin (CSC group)

Session Classification: Poster Presentations