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|  | **Reasoning** |
| CULTURE, GEOSCIENCES |  |
| Integrate fracture simulation into a comprehensive multidisciplinary workflow | Incorporate geoscientific understanding into a numerical framework. Eventually, numerical models must enhance the geologic understanding of the field. |
| Shifting to a new fracture modeling culture | Subsurface technicians have been extensively trained in dual porosity approaches for a long time, and the transition to EDFM modeling is not immediate. Additionally, existing tools must be enhanced to support EDFM pre- and post-processing for field-scale applications. |
| WORKFLOW AND SOFTWARE |  |
| Integrate framework for fractured media visualization | Lack of an integrated post-processing tool to deal with a matrix-fracture flow visualization in a comprehensive way to be used by geoscientists and engineers. |
| Fracture network modeling | Deterministic and stochastic approaches and main inputs from outcrops, cores, image logs, seismic, and field measurements |
| Derive DFN transmissibility from field data | Aperture is not strongly correlated to transmissibility in NFR. The DFN contribution to flow must be derived from field data. |
| DFN-aware optimization workflows | History matching and uncertainty assessment using DFN parameters are not consolidated |
| UPSCALING, MULTIPHASE |  |
| Upscaling of fracture networks | Need to understand the impact of reducing the DFN into as few equivalent numerical features as possible |
| PROPAGATION |  |
| Time-dependent fracture dynamics | Missing criteria for transmissibility updates for modeling fracture initialization and propagation |
| Propagation of non-planar fractures | Temperature and reactive transport result in complex fracture geometry |
| BENCHMARKS |  |
| Parameterization of the multiphase flow through the DFN | Most investigation considers only single-phase, ignoring capillary pressure and imbibition phenomena in the fractures |
| Geologically consistent public benchmarks | There are no benchmark models to compare and investigate the accuracy and efficiency of numerical flow algorithms |