Digital design, digital operations – current practice and trends

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Digital design and operations are hot topics in the process industries. Significant value can be created by combining deep process knowledge, in the form of high-fidelity first-principles process models, with laboratory and/or plant data. For digital design, experimentation is used to support the construction of a high-fidelity predictive model ('digital twin'). Once a digital twin of sufficient accuracy is available, it is used to optimise the process design and operation, through rapid and systematic exploration of the process decision space and rigorous quantification and management of technology risk, significantly accelerating new process development. In operations, model-based digital twins implemented within a robust digital applications framework, can now be used for monitoring, soft sensing, run length prediction, real-time optimisation and general operations decision support. This presentation describes a comprehensive vision for digitalisation encompassing the principles outlined above, and a practical set of technologies and solutions capable of delivering significant value.