

Model as You Write, or Write as You Model _ A Grammar-Based Approach to Modeling and Documentation

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Abstract. Model-Based Systems Engineering (MBSE) is the formalized application of modeling to support activities necessary for development of systems and is expected to replace the document-centric approach that has been practiced by systems engineers. Many models of systems are being developed by many engineers, but most engineers still write documents in addition to developing models. This is because the semantics of the models is not embedded in the models and is usually provided in documents. This paper proposes a novel approach to development of documents and models at the same time. In this approach, technical information is encoded with an artificial language. The grammar of this language specifies how the semantics of situations should be encoded into sentences. Generated sentences can be converted to other forms such as diagrams, tables, and/or text in any natural language. Generated sentences can also be converted to electronic data, which can be used by any application program. With this approach, documents can be used as models, too, because documents are written according to strict syntactic and semantic rules. At the same time, models can be used as documents, too, because the semantic information necessary for interpreting models is embedded in the model. This approach can be applied to any technical information, which includes requirement specifications, design specifications, interface specifications, development plans, test plans, test procedures, and operation procedures.