Animation definition Catalog:

We realized the presence of some model animator definition based on scientific papers of conferences and workshops concerned by the modeling community (e.g. Models, ECMFA, SoSyM) where model transformation is an interesting topic for research and industry. We have found that animation sometimes well explained in the scientific papers and sometimes drowned in the paper discussions. By exploring the literature, there are some overlaps between the concepts of visualization and animation in the context of model transformation (i.e. describe its structure). For instance, many researchers in the scientific papers use the concepts of animation that really means a visualization of model transformation. Also, the animation concept is misused, several terms that revolve around the notion of animation become essential to properly pose the concepts and related notions (simulation, visualization, etc.).

Paper Title	Animation Definition
Animation as a dynamic visualization technique for improving process model comprehension	• **Animation** can be seen as a dynamic visualization technique.
Introducing Simulation and Model Animation in the MDE Topcased1 Toolkit	• Model execution or **animation**
Generative Technologies for Model Animation in the TopCased Platform	• **A model animators** allow to change graphical properties (like color, font, etc.) of graphical elements (e.g. animate UML state charts, current states were shown in red and fireable transition were displayed in green. • **Model animation** allows to design interactively the behavioral verification scenario that fits the current state of the models.
Model transformation intents and their properties	• **Animation** is the visualization of a simulation. It projects the behavior of a model on a specific animation view. In contrast with a simulation transformation, an animation transformation operates on the concrete syntax (or the abstract syntax of the concrete syntax) of a model.
GEMOC Methodology "**Sirius Animator"**	• Providing model animation mainly consist in offering representations (textual, graphical, tabular, or even specialized views) for the data that changes during model execution (ie. RunTime Data). • ***Sirius Animator****, an extension to the model graphical syntax designer Sirius (http://www.eclipse.org/sirius) to create graphical animators for executable modeling languages*5 • ***A model animator*** *parameterized by the graphical representation defined with Sirius Animator to animate executable models.*

Andreas Pleuss and Heinrich Hussmann. Model-driven development of interactive multimedia applications with MML. 2011	• Authors mean by **Animation** "*any kind of change over the time, like changing its position on the screen or changing its shape*"
Radfelder, Oliver and al. Visualization of Formal Specifications for Understanding and Debugging an Industrial DSL. AVI. 2000.	• visualizing **animation** of various DSL programs (i.e. execution of specifications)
Programming Animation Using Behavioral Programming	• **Animation** programs can be executed by calculating the location of an object according to the time elapsed between clock ticks, while considering the location of the other objects. • *I think that animation is defined at the code level***?**
Introducing Simulation and Model Animation in the MDE Topcased Toolkit.	• **Model animator**: Animating a model consists in interpreting each event to make the model evolve accordingly. The effect of one event on the model is defined in the *execution engine* that follows the semantics of the model.
Every Animation Should Have a Beginning, a Middle, and an End A Case Study of using a Functor-based Animation Language	• **Animations** are sequences of still images chained together to tell a story. Every story should have a beginning, a middle, and an end. • The behavior of a dynamic system is illustrated by a visual model that is animated over time

Specifying and Generating Editing Environments for Interactive Animated Visual Models	• That means, the visual representation just depends on the (continuously) proceeding time between two consecutive state transitions. • The visual representation of a model is determined by the current state of the state-transition-system and the current time. • --- **Definition 1** An *abstract animation system* is a tuple $A = (S, E, \tilde{E}, s_0, \delta, \tau, \varepsilon)$. S is the *set of states* and s_0 is the *initial state*, $s_0 \in S$. E is the *set of all events*, whereas $\tilde{E} \subseteq E$ is the *set of internal events*. $E \setminus \tilde{E}$ denotes the set of *external events*. δ is the *state transition function*, $\delta : S \times E \times T \to \mathbf{P}(S)$. τ and ε describe the *occurrence of internal events*, $\tau : S \to T^{\omega}$ and $\varepsilon : S \to \mathbf{P}(\tilde{E})$. Each of these sets may be uncountably infinite. The abstract animation system A is started in state s_0 at some point in time t_0. The execution of A is expressed by the chronology of occurred states; state changes are triggered by occurring events (internal and also external) at certain points in time. Each execution can be described by a *trace* $$s_0 \xrightarrow[t_1]{e_1} s_1 \xrightarrow[t_2]{e_2} s_2 \xrightarrow[t_3]{e_3} \cdots \xrightarrow[t_i]{e_i} s_i \xrightarrow[t_{i+1}]{e_{i+1}} \cdots$$ of assumed states $s_0, s_1, s_2, \ldots \in S$. In each case, at the point in time t_i $(i > 0)$, event e_i occurs and triggers the state transition from s_{i-1} to $s_i \in \delta(s_{i-1}, e_i, t_i)$. Either $e_i \in \varepsilon(s_{i-1})$, i.e., e_i is an internal event, then $t_i = \tau(s_{i-1})$, or $e_i \in E \setminus \tilde{E}$, i.e., e_i is an external event, then $t_i \in [t_{i-1}, \tau(s_{i-1}))$. •
Our Definition	• *Animation is any kind of change over the time on dynamic properties of graphical elements (like color, font, position, etc.) that captures properties defining the behavioral semantics for purposes such as debugging, tracing and simulation of the models through starting, stopping or modifying of this animation.*