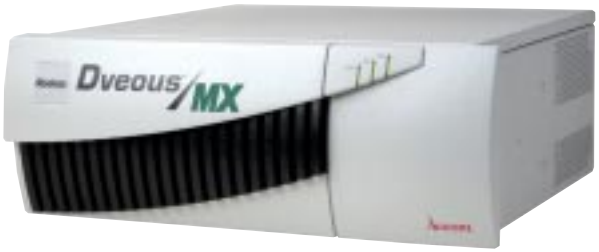
Quick Contents

Section 7: Motion Control



Accom®

Overview

The look of an effect depends a lot on how the transition occurs from one keyframe to the next. The motion path settings covered in this section let you control how Dveous/MX makes that transition.

Motion path types can be assigned to any parameter that is changeable on keyframe-by-keyframe basis. Some parameters take only certain path types, while others accept all path types. If you try to assign an invalid path type to a parameter, the system assigns the highest priority path type available to it.

The PATH Button (Numeric Key Pad)

The **PATH** button accesses and sets one of six available motion path types. When you press **PATH**, this message appears in the keypad buffer:

<<Set Path>>.
JP LN SL T1 T2 SM

The path types are displayed in abbreviated form from lowest to highest. Reading from left to right they are: Jump, Linear, Smooth Linear, Tension Continuity Bias 1 (TCB1), TCB 2 and Smoothed Motion. Press **PATH** to cycle through the path types and select one.

Dveous/MX only uses path type to interpolate between settings in keyframes. It does not interpolate from one path type to another. For example, say an effect has jump (JP) motion set on a parameter for keyframe 1, then smooth motion (SM) on keyframes 2 and 3. When you run the effect, Dveous/MX uses jump motion between keyframes 1 and 2, then switches to smooth motion for the rest of the effect.

Assigning a Motion Path Type

You can assign a path type to either a single parameter, to the parameters associated with a function softkey, or to all the parameters in an entire menu.

- **To assign a motion path to a single parameter:**

  Toggle the **PATH** button to highlight the desired path. Press the keypad softkey (**A**, **B**, **C**, or **D**) associated with the parameter. The path type abbreviation appears next to the parameter value.

- **To assign the same path type to all the parameters for a softkey**:

  Toggle the **PATH** button to highlight the desired path. Then hold the **PATH** button down and press the function softkey. The path types appears next to all parameter values for that function.

- **To assign a path type to an entire menu:**

  Toggle the **PATH** button to highlight the desired path. then hold the **PATH** button down and press the menu button.

  Remember that if you try to assign an invalid path type to a parameter, the system assigns the highest priority path type available to it. For example, if you try to assign ***Smooth*** to a parameter that only uses ***JP***, ***LN*** or ***SL***, the system will assign *SL* instead.

Path Types

The path types are listed below in order of priority from lowest to highest.

JP (Jump)

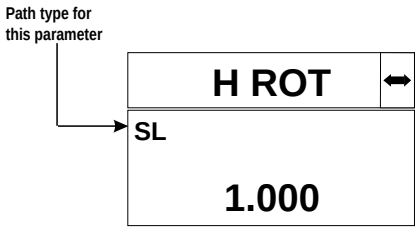
Jump is similar to "Hold" in other DVEs. It holds the parameter value through the duration of the keyframe; there is no interpolation between keyframes. At the first field of the next keyframe, the parameter "jumps" to the setting for that keyframe. Note that even if you run an effect backward, Dveous/MX looks ahead for hold flags, so the effect runs properly in reverse.

LN (Linear)

This motion type interpolates in a straight line (in both motion and time) between the parameters of the current keyframe and those in the next keyframe.

SL (Smoothed Linear)

Smoothed Linear gives the parameter a linear motion path between keyframes, but adds acceleration at the start of the current keyframe and deceleration into the next. This path creates a natural motion effect between keyframes, especially on border and crop settings.



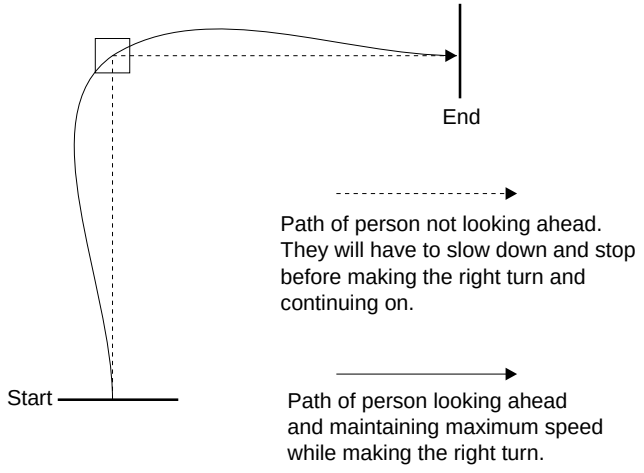
Smoothed (SM)

The smoothed path mode uses a look ahead over the entire effect to calculate the motion path, and creates the smoothest path possible for both motion and time.

For example, when using TCB, a Z rotate in keyframe 3 of a six keyframe effect affects the path from keyframes 2 through 5 (the four keyframe window). In smooth mode, the rotate affects the paths of all six keyframes, with less impact on the keyframes further from the actual rotate.

TCB 1 and TCB 2

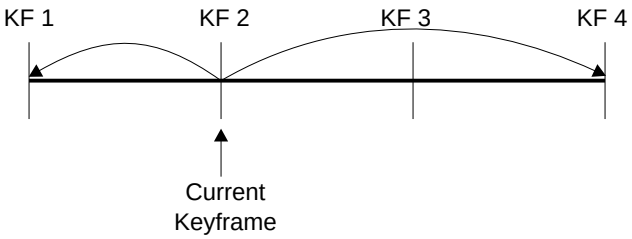
TCB is an abbreviation for Tension, Continuity, and Bias. The premise behind TCB motion is that the source image moving in 3D space has mass, which prevents it from changing direction or speed instantly. Dveous/MX must "look ahead" to the next keyframe, and "look behind" to the previous keyframe, to determine how best to pass the image through the keyframes and maintain realistic looking speeds and paths.



There are two independent sets of tension, continuity, and bias values per keyframe for each channel timeline. Transitions between keyframes with different ***TCB*** settings have a linear path to prevent "popping" when changing from one value to another. The motion algorithms are based on matrix math that includes vector calculations and keyframe look aheads. It may be more intuitive to use a physical model to demonstrate the effect of ***TCB*** motion. Although the internal calculations do not work exactly as the model suggests, the results are the same.

For this example, imagine a person running from one place to another, then turning right and heading to a third position. He must first accelerate to his maximum speed while heading to the position where he will make the right turn. The shortest distance between two points is a straight line, but if the person is going to make a right turn, he would have to stop forward motion at the second position, change directions, then move forward again. To maintain maximum speed and avoid stopping, the person can veer a little to the left and then back to the right as he approaches the second position; in this way he is already making the right turn and does not need to slow down as much.

Four Keyframe TCB Window Example

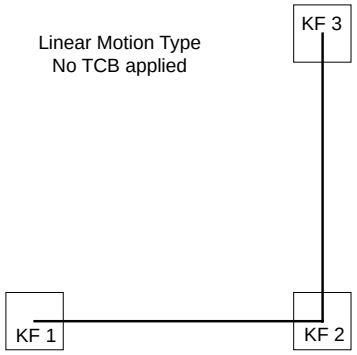


All of this means that the person must look ahead and anticipate the change in direction. In the TCB modes, Dveous/MX looks past the keyframe immediately ahead to the one after it, and uses that information to determine the needed path. Also, what happened between the current keyframe and the previous one also affects the current path. This is similar to the person making the right turn not being able to follow a straight path to the third position: the right turn is not complete until sometime after he passes the second position.

Note: TCB1 and TCB2 are user set parameters. These adjustments can be made under the **PATH** button in the Effects part of the Control Panel. (Notice there are two **PATH** buttons; one green key cap in the Effects section for adjusting TCB1 and TCB2 parameters and one gray key cap in the Numeric Key Pad section used for selecting the path type desired.)

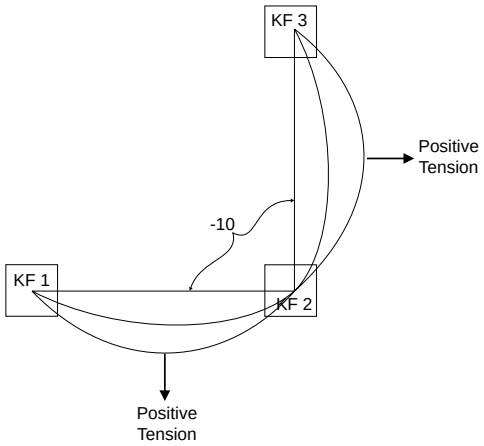
Dveous/MX uses a four keyframe window in the TCB modes. This is commonly known as a two keyframe "look ahead," but there is also a one keyframe "look behind." In a two keyframe effect, there is nothing to look ahead to; changing the TCB settings has no effect. Acceleration and deceleration do apply, however.

For the purposes of this discussion, we will use a simple effect with three keyframes. The image has been sized and moved as illustrated in the figure below. The TCB values are active on all keyframes. For our physical model, think of the keyframes as blocks of wood, and the path they follow as a flexible cord, such as a garden hose. The first figure shows a linear path for the keyframes.



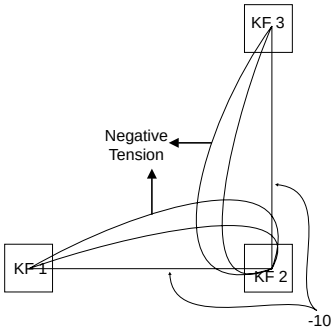
Tension

Adding tension acts like attaching strings to the hose on either side of keyframe 2. We then ask two people to each take a string and pull on it. The default tension value, 7, provides a natural looking path. Increasing the tension value exaggerates the path, and it overreacts to the look ahead. The maximum value is 100.



A value of -10 produces the same effect as the smooth-linear motion type. There is acceleration and deceleration into and out of keyframes, but the path is straight (linear). This is the equivalent of no look ahead. Note that the motion actually stops at each keyframe: with no look ahead, Dveous/MX treats each keyframe as if it is the last one. A use for TCB with tension set to -10, instead of the SL mode, is that you can interpolate to this setting from a different tension value. This is very useful when you want to stop the look ahead smoothly, such as on a keyframe with a pause.

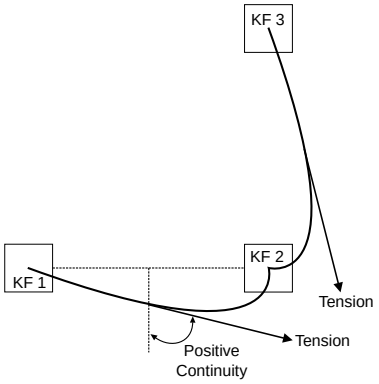
As the values increase in the negative direction, they produce a path that enters and leaves each keyframe in opposite directions than with values above -10. The end of the negative range is -100.

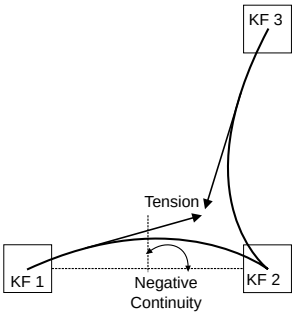


Continuity

Continuity describes the angle at which we exert tension on the hose with the string. With a zero continuity setting, the string pulls the hose at right angles to the linear path, producing a symmetrical arc. For this example, only keyframe 2's continuity setting is changed. Positive continuity values angle the pulling force toward the outside of keyframe 2. Negative continuity settings angle the pulling force toward the inside of keyframe 2.

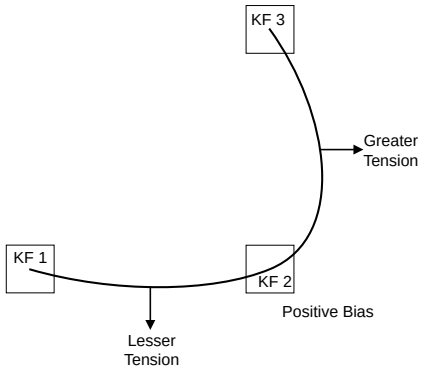
The tension setting also affects the continuity changes. Setting tension to -10 causes the continuity settings to have no effect.



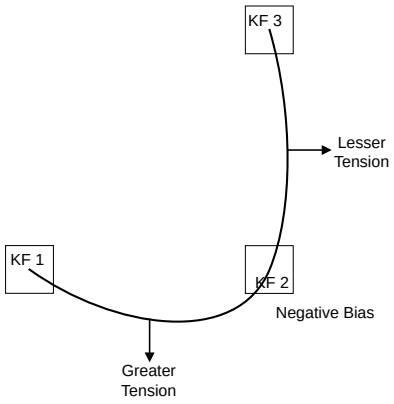


Bias

The bias setting determines how much tension (pulling force) applies to each hose, as though the people pulling the strings had unequal strengths. A zero bias setting distributes the pulling force equally between both hoses. Positive bias settings increase the pulling force after keyframe 2, with a corresponding decrease before the keyframe. Negative bias settings increase the pulling force before keyframe 2, with a corresponding decrease after the keyframe.



In the example of the person running through a right turn, bias settings effectively determine how much of the turn is complete by the second point. With bias at 0, half the turn is complete. With a positive bias, less than half the turn is complete at the second point. With a negative bias, more than half the turn is complete.



The tension setting also affects bias changes. Setting tension to -10 causes the bias settings to have no effect. You can use bias and continuity independently of each other.

Using TCB 1 and TCB 2

The previous discussions dealt with a very simple effect that used position changes only. In building effects that use position, rotate, and size changes at the same time, you will find achieving the exact motion path you need is a little more complex.

Rotate parameters are notorious for causing unwanted movement in an effect. Setting tension to -10 removes the unwanted motion, but also affects position and size changes. Normally, only the rotate look ahead is incorrect, and is the only parameter that needs the -10 tension setting.

All parameters that can use the TCB 1 mode have it enabled by default. TCB 2 lets you use two TCB settings in an effect at the same time: one TCB setting on some parameters, the other TCB setting on others. In the above example, setting the tension on TCB 2 to -10 and assigning it to the rotate parameters eliminates the rotate look aheads, but lets the position and size operate in the normal TCB 1 tension, 7.