

Easing

Easing functions describe functions that control the way an interpolation between 0 and 1 is done.

The most basic easing function, linear, is just a linear interpolation at constant speed. Other more advanced easing functions can have acceleration at the beginning, the end or both or deceleration, or even bouncing or elastic effects.

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Preliminary note

In the functions using easing, there are usually 3 optional parameters. Most functions don't need them at all, the ones needing one or more parameters are listed in the table below. When providing optional parameters, all the parameters before a given parameter must be filled, even if the easing function you intend to use doesn't require such a parameter. In this case, simply use 0 for the parameters you don't need. Examples:

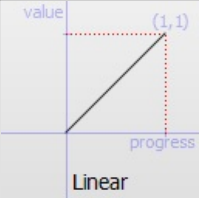
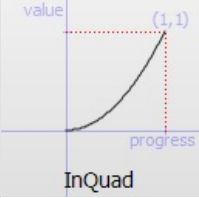
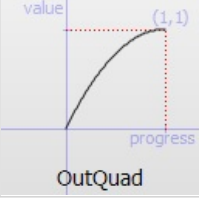
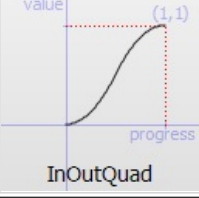
- *"Linear"* can be used simply with *getEasingValue(fProgress, "Linear")*
- *"OutElastic"* can define *fEasingPeriod* and *fEasingAmplitude* so it can be used with *getEasingValue(fProgress, "OutElastic", 0.3, 1.0)*
- *"InBack"* can define *fEasingOvershoot*, but since it comes after *fEasingPeriod* and *fEasingAmplitude* in the order of parameters, 0 must be used for the others with *getEasingValue(fProgress, "InBack", 0, 0, 1.7015)*

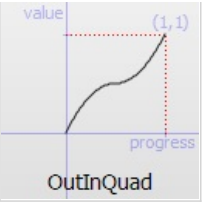
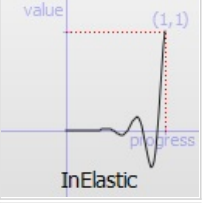
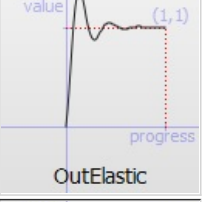
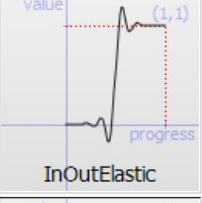
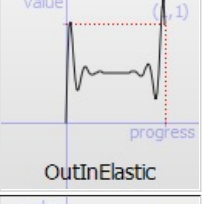
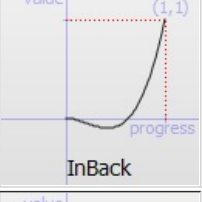
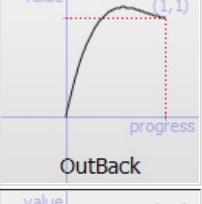
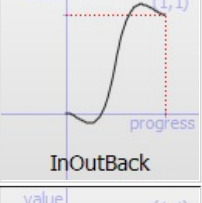
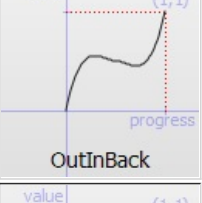
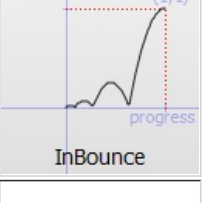
Easing functions

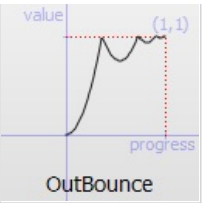
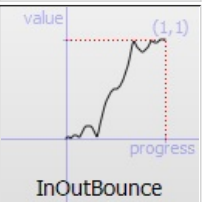
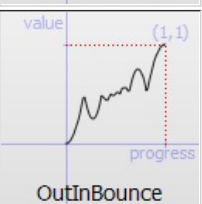
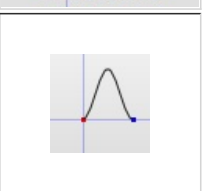
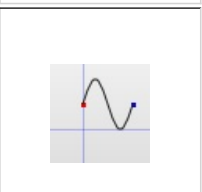
--List of builtin easing functions
builtins={ "Linear", "InQuad", "OutQuad", "InOutQuad", "OutInQuad", "InElastic", "OutElastic", "InOutElastic", "OutInElastic", "InBack", "OutBack", "InOutBack", "OutInBack", "InBounce", "OutBounce", "InOutBounce", "OutInBounce", "SineCurve", "CosineCurve" }

Default values are (when a function can use a parameter but it's not defined by the user):

- *fEasingPeriod*: 0.3
- *fEasingAmplitude* : 1.0
- *fEasingOvershoot*: 1.701

| Easing function | Function profile | Uses fEasingPeriod | Uses fEasingAmplitude | Uses fEasingOvershoot | Comments |
|-----------------|---|--------------------|-----------------------|-----------------------|----------|
| Linear |  | | | | |
| InQuad |  | | | | |
| OutQuad |  | | | | |
| InOutQuad |  | | | | |
| | | | | | |

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|--------------|---|-----|-----|-----|--|
| OutInQuad |  The graph shows a smooth S-curve starting at (0,0) and ending at (1,1). The curve is concave up for the first half and concave down for the second half. The y-axis is labeled 'value' and the x-axis is labeled 'progress'. A dashed red line connects (1,1) to the axes. | | | | |
| InElastic |  The graph shows a curve that starts at (0,0) and ends at (1,1) with an elastic effect, oscillating below the diagonal. The y-axis is labeled 'value' and the x-axis is labeled 'progress'. A dashed red line connects (1,1) to the axes. | yes | yes | | Due to the elastic effect, this easing function produces some values < 0 |
| OutElastic |  The graph shows a curve that starts at (0,0) and ends at (1,1) with an elastic effect, oscillating above the diagonal. The y-axis is labeled 'value' and the x-axis is labeled 'progress'. A dashed red line connects (1,1) to the axes. | yes | yes | | Due to the elastic effect, this easing function produces some values > 1 |
| InOutElastic |  The graph shows a curve that starts at (0,0) and ends at (1,1) with an elastic effect, oscillating both below and above the diagonal. The y-axis is labeled 'value' and the x-axis is labeled 'progress'. A dashed red line connects (1,1) to the axes. | yes | yes | | Due to the elastic effect, this easing function produces some values < 0 and > 1 |
| OutInElastic |  The graph shows a curve that starts at (0,0) and ends at (1,1) with an elastic effect, oscillating both below and above the diagonal. The y-axis is labeled 'value' and the x-axis is labeled 'progress'. A dashed red line connects (1,1) to the axes. | yes | yes | | Due to the elastic effect, this easing function produces some values < 0 and > 1 |
| InBack |  The graph shows a curve that starts at (0,0) and ends at (1,1) with an overshoot effect, starting below the diagonal and then curving up. The y-axis is labeled 'value' and the x-axis is labeled 'progress'. A dashed red line connects (1,1) to the axes. | | | yes | Due to overshoot, this easing function produces some values < 0 |
| OutBack |  The graph shows a curve that starts at (0,0) and ends at (1,1) with an overshoot effect, starting above the diagonal and then curving down. The y-axis is labeled 'value' and the x-axis is labeled 'progress'. A dashed red line connects (1,1) to the axes. | | | yes | Due to overshoot, this easing function produces some values > 1 |
| InOutBack |  The graph shows a curve that starts at (0,0) and ends at (1,1) with an overshoot effect, oscillating both below and above the diagonal. The y-axis is labeled 'value' and the x-axis is labeled 'progress'. A dashed red line connects (1,1) to the axes. | | | yes | Due to overshoot, this easing function produces some values < 0 and > 1 |
| OutInBack |  The graph shows a curve that starts at (0,0) and ends at (1,1) with an overshoot effect, oscillating both below and above the diagonal. The y-axis is labeled 'value' and the x-axis is labeled 'progress'. A dashed red line connects (1,1) to the axes. | | | yes | |
| InBounce |  The graph shows a curve that starts at (0,0) and ends at (1,1) with a bounce effect, oscillating below the diagonal. The y-axis is labeled 'value' and the x-axis is labeled 'progress'. A dashed red line connects (1,1) to the axes. | | yes | | |
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|-------------|--|--|-----|--|---|
| OutBounce |  <p>The graph shows the OutBounce easing function. The y-axis is labeled 'value' and the x-axis is labeled 'progress'. The curve starts at (0,0), rises to a peak, dips, rises again to a higher peak, and then settles at (1,1). A dashed red line connects (1,1) to the axes. The label 'OutBounce' is at the bottom of the graph.</p> | | yes | | |
| InOutBounce |  <p>The graph shows the InOutBounce easing function. The y-axis is labeled 'value' and the x-axis is labeled 'progress'. The curve starts at (0,0), dips, rises to a peak, dips again, and then rises to (1,1). A dashed red line connects (1,1) to the axes. The label 'InOutBounce' is at the bottom of the graph.</p> | | yes | | |
| OutInBounce |  <p>The graph shows the OutInBounce easing function. The y-axis is labeled 'value' and the x-axis is labeled 'progress'. The curve starts at (0,0), rises to a peak, dips, rises again to a higher peak, and then settles at (1,1). A dashed red line connects (1,1) to the axes. The label 'OutInBounce' is at the bottom of the graph.</p> | | yes | | |
| SineCurve |  <p>The graph shows the SineCurve easing function. The y-axis is labeled 'value' and the x-axis is labeled 'progress'. The curve starts at (0,0), rises to a peak, and then falls back to (1,0). A dashed red line connects (1,0) to the axes. The label 'SineCurve' is at the bottom of the graph.</p> | | | | This easing function doesn't end at 1 but goes back to 0. In this case, for interpolation, the target value is just an edge but doesn't represent the stop value. |
| CosineCurve |  <p>The graph shows the CosineCurve easing function. The y-axis is labeled 'value' and the x-axis is labeled 'progress'. The curve starts at (0,0), rises to a peak, dips, rises again to a higher peak, and then settles at (1,1). A dashed red line connects (1,1) to the axes. The label 'CosineCurve' is at the bottom of the graph.</p> | | | | This easing function both starts and stops at 0.5, going first to 1 then 0. In this case, for interpolation, the source and target values are just the edges but don't represent the start/stop values. |