9.10.1 Physics - Force Fields - Introduction

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Force Fields

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Introduction

Force Fields offer a way to add extra movement to dynamic systems. *Particles*, *Soft Bodies*, Rigid Bodies and *Cloth objects* can all be affected by forces fields. Force Fields automatically affect everything. To remove a simulation or particle system from their influence, simply turn down the influence of that type of Force Field in its Field Weights panel.

- All types of objects and particles can generate fields, but only curve object can bear *Curve Guides* fields.
- Force Fields can also be generated from particles. See *Particle Physics*
- The objects need to share at least one common layer to have effect.

You may limit the effect on particles to a group of objects (see the *Particle Physics* page).

Creating a Force Field

Reference
Mode: *Object* Mode Panel: *Object* context –> *Physics* sub-context –> *Fields*

To create a single Force Field, you can select Add ‣ Force Field and select the desired force field. This method creates an Empty with the force field attached.

To create a field from an existing object you have to select the object and change to the *Physics* sub-context. Select the field type in the *Fields* menu.

The fields have many options in common, these common options are explained for the *Spherical* field.

Note

After changing the fields (*Fields* panel) or deflection (*Collision* panel) settings, you have to recalculate the particle, softbody or cloth system (*Free Cache*), this is not done automatically. You can clear the cache for all selected objects with `Ctrl-B` –> *Free cache selected*.

Particles react to all kind of *Force Fields*, *Soft Bodies* only to *Spherical* / *Wind* / *Vortex* (they react on *Harmonic* fields but not in a useful way).

Common Field Settings

Most Fields have the same settings, even though they act very differently. Settings unique to a field type are described below. Curve Guide and Texture Fields have very different options.

Shape
: The field is either a *Point*, with omnidirectional influence, or a *Plane*, constant in the XY-plane, changes only in Z direction.

Strength
: The strength of the field effect. This can be positive or negative to change the direction that the force operates in. A force field's strength is scaled with the force object's scale, allowing you to scale up and down scene, keeping the same effects.

Flow
: Convert effector force into air flow velocity.

Noise
: Adds noise to the strength of the force.

Seed
: Changes the seed of the random noise.

Effect Point
: You can toggle the field's effect on particle *Location* and *Rotation*

Collision Absorption
: Force gets absorbed by collision objects.

Falloff

Here you can specify the shape of the force field (if the *Fall-off* Power is greater than 0).

Sphere
: Falloff is uniform in all directions, as in a sphere.

Tube
: Fall off results in a tube shaped force field. The Field's *Radial falloff* can be adjusted, as well as the *Minimum* and *Maximum* distances of the field.

Cone
: Fall off results in a cone shaped force field. Additional options are the same as those of *Tube* options.

Z Direction
: *Fall-off* can be set to apply only in the direction of the positive Z Axis, negative Z Axis, or both.

Power (Power)
: How the power of the force field changes with the distance from the force field. If `r` is the distance from the center of the object, the force changes with $1/r^{Power}$. A *Fall-off* of 2 changes the force field with $1/r^2$, which is the falloff of gravitational pull.

Max Distance
: Makes the force field only take effect within a specified maximum radius (shown by an additional circle around the object).

Min Distance
: The distance from the object center, up to where the force field is effective with full strength. If you have a *Fall-off* of 0 this parameter does nothing, because the field is effective with full strength up to *Max Dist* (or the infinity). Shown by an additional circle around the object.