mkmov.py Documentation

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1 OVERVIEW

This utility automates the process of generating MPEG movies from `pkdgrav` output. The steps are to run `ssdraw` on `pkdgrav` output files, convert the files using either `povray` or `rastoppm` to a format readable by `ffmpeg`, then generate the movie. Each of these programs must be in the user's search path for this script to work. In addition, at a minimum the user must provide `ssdraw.par` to go along with the `pkdgrav` output files. If available, `ss.par` is used to determine the `pkdgrav` output basename (otherwise "`ss`" is assumed)—the output files are assumed to be of the form `basename.[0-9]*[0-9]` (i.e., the basename followed by at least 2 digits, representing the timestep) and optionally with "`.r`" appended in the case of reduced output. If invoking POV-Ray (determined by the particle shape in `ssdraw.par`), the user must also provide `povray.inc` in the run directory.

2 USAGE

The script can be run without arguments (that's the whole idea!), but several options are provided for added functionality, as follows:

`--help` If present, shows a usage message and exits.

`--force` If present, overwrites any existing images. Cannot be used with `--keep`. Useful when redoing a movie from scratch and old images already exist in the run directory.

`--keep` If present, retains existing images without overwriting them. Cannot be used with `--force`. Useful for generating images from newly added output without having to regenerate images. A new movie using the both old and new images will be made.

`--batch` If present, runs `ssdraw` on all `pkdgrav` output files at once (depending on the `--force|--keep` flags). Needed when using `ssdraw` functionality that is frame-number dependent, such as an inertial camera. Otherwise `ssdraw` is run on one file at a time (followed by image conversion and cleanup on each).

`--color24` Indicates that the `pkdgrav` output files use 24-bit color instead of a color index. Only valid for POV-Ray output. Useful in conjunction with the `sscolor` utility.

`--orient` Indicates that `ssdraw` should take particle orientation into account when drawing. Requires `pkdgrav` to be compiled and run with orientation support (making "`.ori`" files in addition to regular outputs). Only valid for POV-Ray output.

`--quiet` If present, runs the script in "quiet" mode, with no output to the terminal unless an error is encountered.

`--nth NTH` Only draws every `NTH` frame (default 1, i.e., draw every frame). Useful for quickly generating a movie. Even more useful in conjunction with `--keep`.

`--rate RATE` Set the movie frame rate to `RATE` frames per second (default 25, which is the `ffmpeg` default). Here `RATE` is a string expression, so "1/5" is interpreted as 5 seconds per frame, and, e.g., "30000/1001" is the proper frame rate for NTSC video. Useful for slowing down or speeding up a movie smoothly (use a low frame rate to slow it down, a high frame rate to speed it up), or to set the frame rate to "real time," knowing the simulation timestep.

Note the above options can be abbreviated to single letters, e.g., `-h` or `--h`, etc.

If both full and reduced `pkdgrav` outputs exist for the same timestep, the reduced output will be used in place of the full output.

3 EXAMPLE

The following example generates a movie from every 10^{th} output frame, using POV-Ray to draw in 24-bit color, setting the frame rate to 1 frame per second, and retaining the image files in the run directory:

```
mkmov.py --keep -c -n 10 -r 1
```