NAME

dctimestep - compute annual simulation time-step(s) via matrix multiplication

SYNOPSIS

dctimestep [**−n nsteps**][**−h**][**−o ospec**][**−i{f|d}**][**−o{f|d}**] **DCspec** [**skyf**]
dctimestep [**−n nsteps**][**−h**][**−o ospec**][**−i{f|d}**][**−o{f|d}**] **Vspec Tbsdf.xml Dmat.dat** [**skyf**]

DESCRIPTION

Dctimestep has two invocation forms. In the first form, *dctimestep* is given a daylight coefficient specification and an optional sky vector or matrix, which may be read from the standard input if unspecified. The daylight coefficients are multiplied against these sky values and the results are written to the standard output. This may be a list of color values or a combined Radiance image, as explained below.

In the second form, *dctimestep* takes four input files, forming a matrix expression. The first argument is the View matrix file that specifies how window output directions are related to some set of measured values, such as an array of illuminance points or images. This matrix is usually computed by *rcontrib(1)* for a particular set of windows or skylight openings. The second argument is the window transmission matrix, or BSDF, given as a standard XML description. The third argument is the Daylight matrix file that defines how sky patches relate to input directions on the same opening. This is usually computed using *genklemsamp(1)* with *rcontrib* in a separate run for each window or skylight orientation. The last file is the sky contribution vector or matrix, typically computed by *genskyvec(1)* or *gendaymtx(1)*, and may be passed on the standard input. This data is assumed by default to be in ASCII format, whereas the formats of the View and Daylight matrices are detected automatically if given as binary data.

If the input sky data lacks a header, the *−n* option may be used to indicate the number of time steps, which will be 1 for a sky vector. The sky input file must contain the number of columns specified in each sky patch row, whether it is read from the standard input or from a file. Input starts from the first patch at the first time step, then the first patch at the second time step, and so on. The *−if* or *−id* option may be used to specify that sky data is in float or double format, respectively, which is more efficient for large matrices. These options are unnecessary in the when the sky input has a header.

The standard output of *dctimestep* is either a color vector with as many RGB triplets as there are rows in the View matrix, or a combined *Radiance* picture. Which output is produced depends on the first argument. A regular file name will be loaded and interpreted as a matrix to generate a color results vector. A file specification containing a '%d' format string will be interpreted as a list of *Radiance* component pictures, which will be summed according to the computed vector.

The *−o* option may be used to specify a file or a set of output files to use rather than the standard output. If the given specification contains a '%d' format string, this will be replaced by the time step index, starting from 1. In this way, multiple output pictures may be produced, or separate result vectors (one per time step).

A header will normally be produced on the output, unless the *−h* option is specified. The *−of* or *−od* option may be used to specify IEEE float or double binary output data, respectively.

EXAMPLES

To compute workplane illuminances at 3:30pm on Feb 10th:

```
gensky 2 10 15:30 | genskyvec | dctimestep workplaneDC.dmx > Ill_02-10-1530.dat
```

To compute an image at 10am on the equinox from a set of component images:

```
gensky 3 21 10 | genskyvec | dctimestep dcomp%03d.hdr > view_03-21-10.hdr
```

To compute a set of illuminance contributions for Window 1 on the Winter solstice at 2pm:

```
gensky 12 21 14 | genskyvec | dctimestep IllPts.vmx Blinds20.xml Window1.dmx > Ill_12-21-14.dat
```

To compute Window2's contribution to an interior view at 12 noon on the Summer solstice:

```
gensky 6 21 12 | genskyvec | dctimestep view%03d.hdr Blinds30.xml Window2.dmx > view_6-21-12.hdr
```

To generate an hourly matrix of sensor value contributions from Skylight3 using a 3-phase calculation,

where output columns are time steps:

gendaymtx -of Tampa.wea | dctimestep WPpts.vmx shade3.xml Skylight3.dmx > wp_win3.dat

Generate a series of pictures corresponding to timesteps in an annual simulation:

gendaymtx NYCity.wea | dctimestep -o tstep%04d.hdr dcomp%03d.hdr

To multiply two matrices into a IEEE-float result with header:

dctimestep -of Inp1.fmx Inp2.fmx > Inp1xInp2.fmx

AUTHOR

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SEE ALSO

gendaymtx(1), genklemsamp(1), genskyvec(1), getinfo(1), mkillum(1), rcollate(1), rcontrib(1), rmtxop(1), rtrace(1), vwrays(1)