

## NAME

xtoys – X window simulators for phase transitions (Ising, Potts, and percolation models); self-organized criticality (sandpile model); cellular automata; wave equations.

## SYNOPSIS

```
xburn tree_density [ block_size ]  
xburn-jar tree_density percolation_probability [ block_size ]  
xising  
xpotts  
xautomalab  
xsand  
xfires  
xwaves  
schrodinger
```

## DESCRIPTION

**xburn**: simulates a forest fire with a two-dimensional percolation model.

**tree\_density** = 0 to 1; try 0.592, the critical point for 2-d percolation;

**block\_size** = 1 to 4; try 4 for a full screen view.

**xburn-jar**: simulates a forest fire with a two-dimensional percolation model, with inclusion of a propagation probability parameter.

**propagation\_probability** = 0 to 1; try .5 to see reduction in burn rate and extent;

**tree\_density** and **block\_size** as for xburn.

**xising**: implements a simulation of the two dimensional Ising model with both local and cluster algorithms.

**xpotts**: for the  $q$  state Potts with a magnetic field.

**xautomalab**: a totalistic cellular automaton simulator; Conway's game of life is a special case.

**xsand**: implements the Bak, Tang, Wiesenfeld sandpile model, illustrating self-organized criticality.

**xfires**: a simple forest fire model of self-organized criticality.

**xwaves**: simulates three different wave equations, representing light, massive mesons, and water.

**schrodinger**: evolves a wave function with the Schrodinger equation. The potential can be modified with the mouse.

The code compiles under *Mac OS X 10.3*. Executables are included in this package.

## OPTIONS

No command line options are implemented, except for xburn and xburn-jar. For programs run without command-line parameters, adjustment of parameter values, if appropriate, is done within the X-window display.

## SEE ALSO

The programs are further documented in the files *readme.txt*, *Demo\_lattice.txt*, *xburn.txt*, *xburn-jar.txt*, *xfires.txt*, *xpotts.txt*, *xwaves.txt*, *xautomalab.txt*, *xising.txt*, and *xsand.txt*. The original sources are available at the xtoys web page: <http://thy.phy.bnl.gov/www/xtoys/xtoys.html>.

## AUTHOR

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