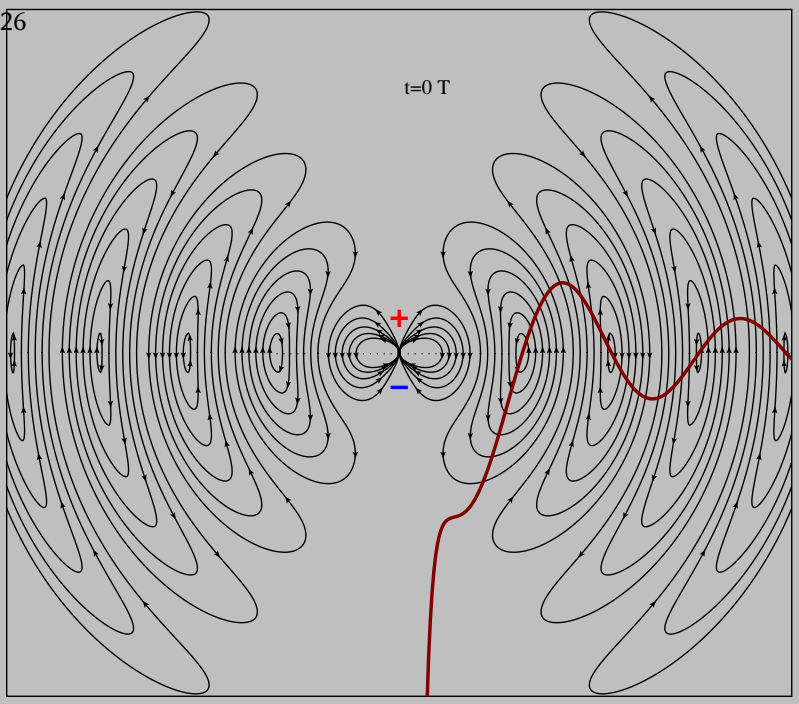
PSTricks

pst-hertz: Representation of the electric field radiated by a Hertzian dipole

Version 0.1

May 29, 2026



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1 Introduction

The files can be run with lualatex, which creates directly the pdf, or with the sequenz latex→dvips→ps2pdf. The last one is to preferred for animations which needs heavy calculations.

pst-hertz-doc The main documentation

pst-hertz-animate The main animation

pst-hertz-text-0 Base file for a gif-animation with
\psHertzDipole[t=\i,lambda=150,Ez=false,linewidth=1pt,h=0.5,FillSpace,HSBFill,DrawLines]

pst-hertz-text-1 Base file for a gif-animation with additional markers and
\psHertzDipole[t=\i,linewidth=1.2pt,linecolor=orange,doublecolor={[rgb]{0 0.5 0}},BiColorLines]

pst-hertz-text-2 Base file for a gif-animation with
\psHertzDipole[t=\i,FieldLines=8,lambda=100,Ez=false,linewidth=0.5pt,DrawArrows=false,h=1,FillSpace,Dr

2 Options for the \psHertzDipole command in the pst-hertz package

Many authors have created visualizations of the electromagnetic field radiated by a Hertzian dipole; the version by Raimund V. Girwidz is the most comprehensive. [1] The objectives of the \psHertzDipole command are much more modest; it allows only for the visualization of electric field lines, utilizing the following options (for which default values are indicated):

- lambda=100: selects the wavelength (in meters);
- t=0: date as a fraction of the period: 0 to 100;
- h=1: iteration step size for the method (RK-4) suggested by Raimund V. Girwidz;
- FieldLines=6: number of lines within the $\lambda/2$ interval;
- ScaleFactor=1: scale factor;

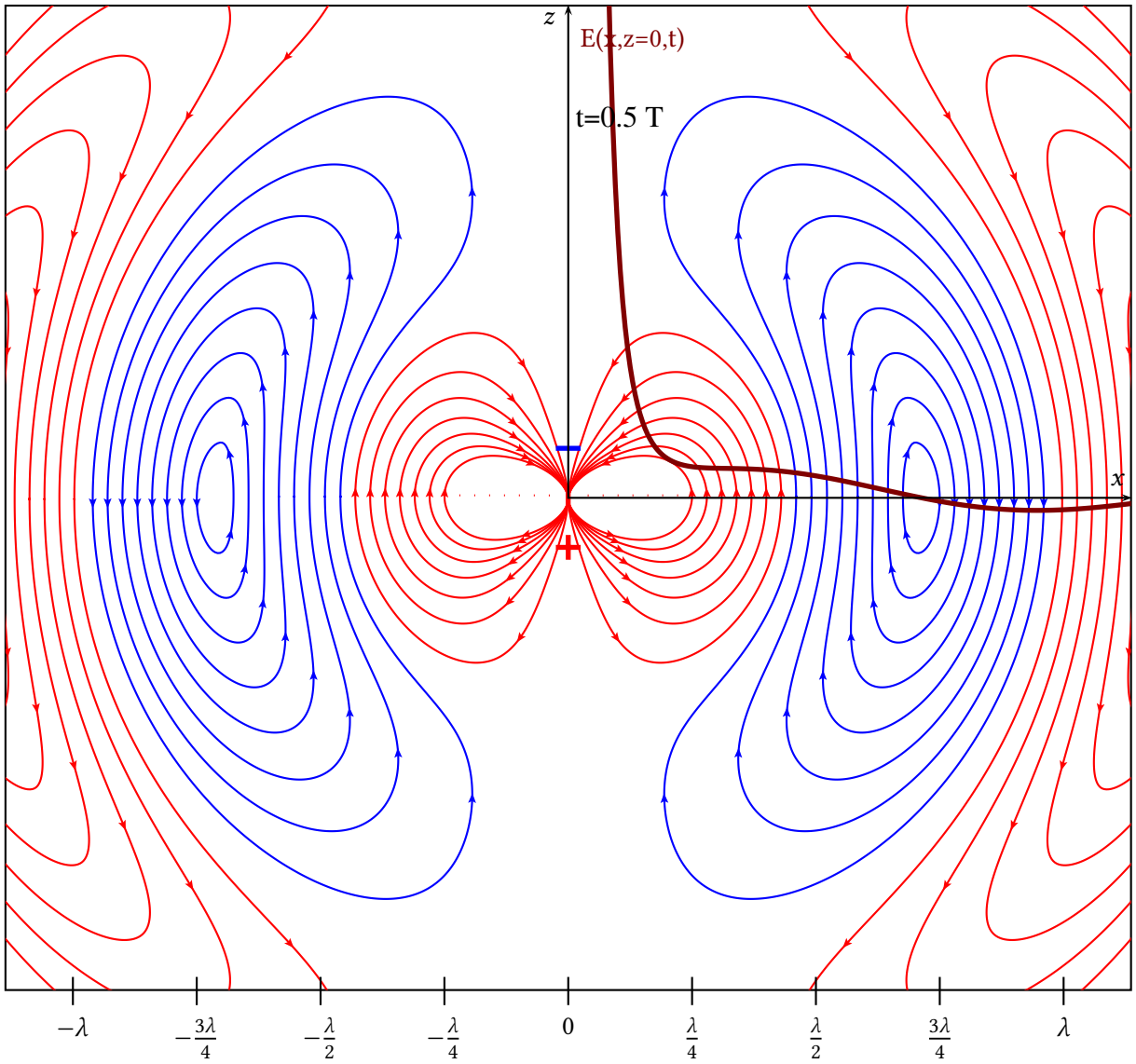
as well as the following Boolean options:

- BiColorLines=false: with the BiColorLines option, the color of the line bundles alternates; one color is defined by the PSTricks command linecolor=… and the other by doublecolor=…;
- DrawArrows=true: draws arrows by default;
- DrawLines=true: draws the lines by default;
- Ez=true: plots $E(x,t)$ at the points $x = 0$;
- FillSpace=false: colors the space between two consecutive lines using two colors—one defined by the PSTricks command fillcolor=… and the other by hatchcolor=…;
- HSBFill=false : : colors the space between the lines using color gradations from the HSB color space.

3 Examples

The drawing at the beginning illustrates the command using the default options; the tick marks have been added manually.

3.1 The two-tone version

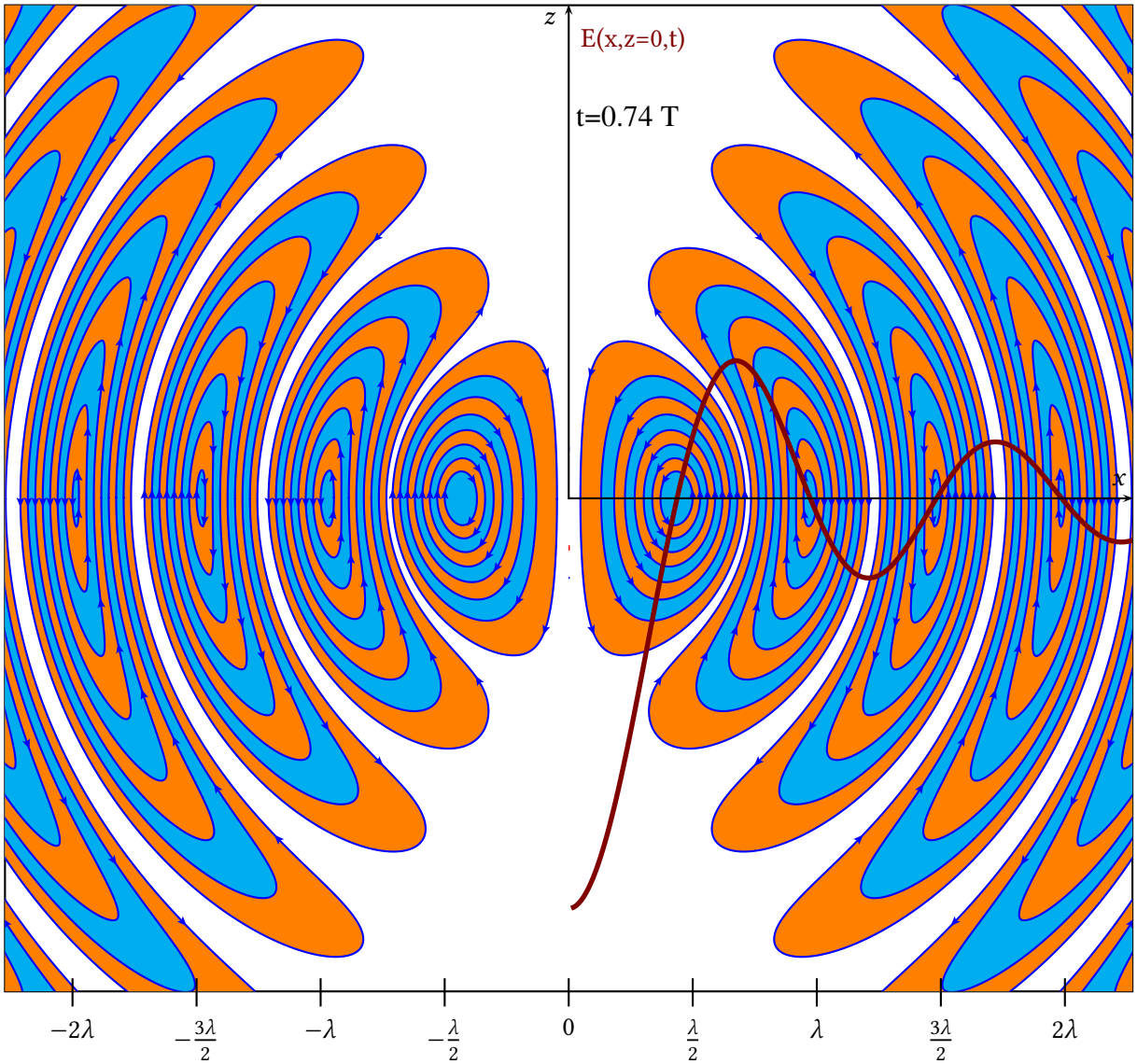


BiColorLines

```
\begin{pspicture}(-8,-8)(8,7)
\psclip{\psframe(-8,-7)(8,7)}
\psHertzDipole[t=50,lambda=200,h=1,BiColorLines,linecolor=red,doublecolor=blue,FieldLines=8]
\endpsclip%
\psline{<->}(0,7)(0,0)(8,0)
\uput[l](0,6.8){$z$}
\uput[u](7.8,0){$x$}
\uput[r](0,6.5){\textcolor{rougesombre}{E(x,z=0,t)}}
\psset{xunit=1pt}
\multido{\i=-200+50}{9}{
\psline(\i,-7.2)(\i,-6.8)}
\uput[d](-200,-7.2){$-\lambda$}
```

```
\uput[d](-150,-7.2){$-\frac{3\lambda}{4}$}
\uput[d](-100,-7.2){$-\frac{\lambda}{2}$}
\uput[d](-50,-7.2){$-\frac{\lambda}{4}$}
\uput[d](200,-7.2){$\lambda$}
\uput[d](150,-7.2){$\frac{3\lambda}{4}$}
\uput[d](100,-7.2){$\frac{\lambda}{2}$}
\uput[d](50,-7.2){$\frac{\lambda}{4}$}
\uput[d](0,-7.2){$0$}
\end{pspicture}
```

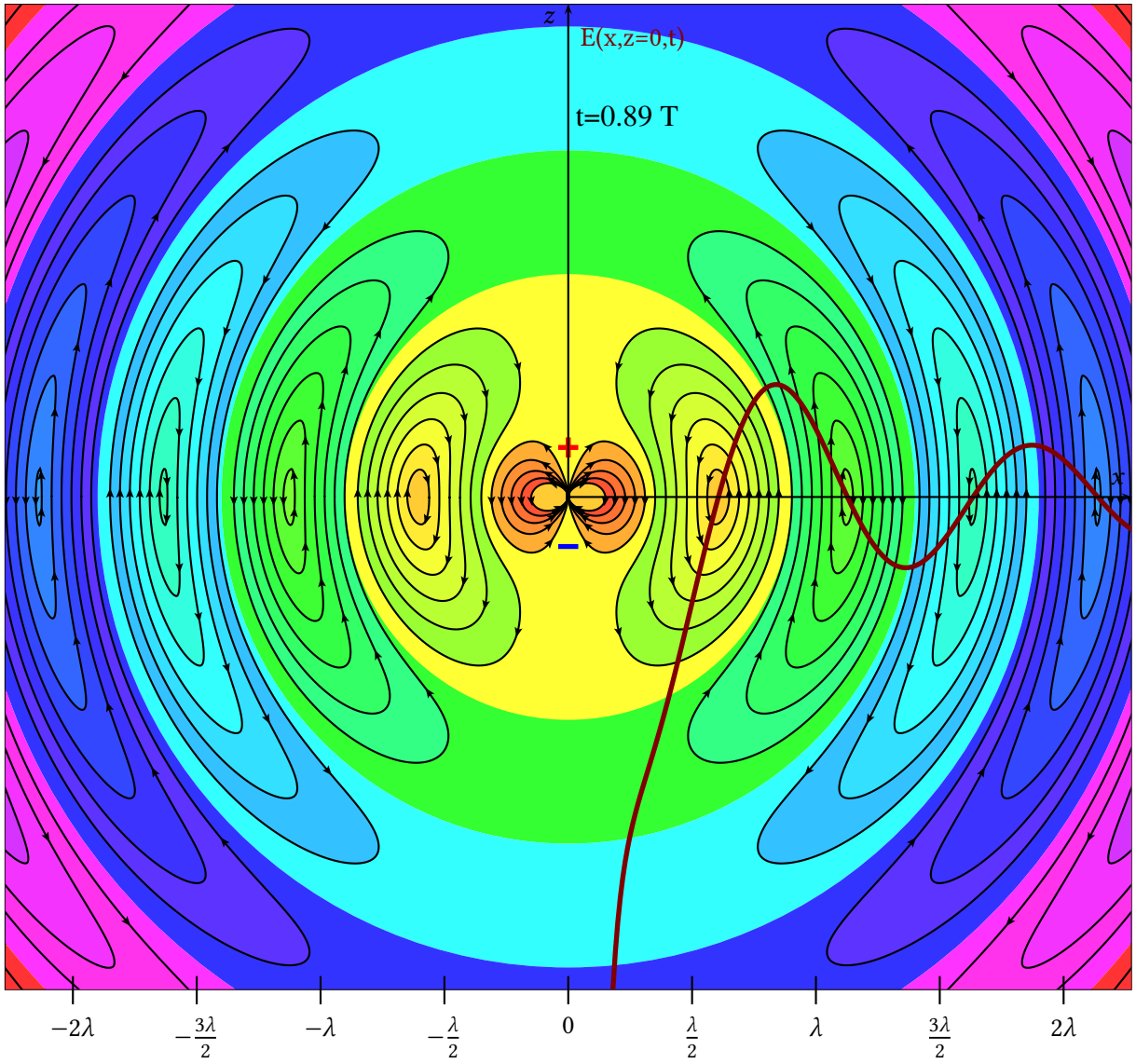
3.2 Color the space between two lines



Colors space

```
\begin{pspicture}(-8,-8)(8,7)
\psclip{\psframe(-8,-7)(8,7)}
\psHertzDipole[t=75,h=0.5,FillSpace,hatchcolor=orange,fillcolor=cyan,linecolor=blue,FieldLines=8]
\endpsclip%
\psline{<->}(0,7)(0,0)(8,0)
\uput[l](0,6.8){$z$}
```

```
\uput[u](7.8,0){$x$}
\uput[r](0,6.5){\textcolor{rougesombre}{E(x,z=0,t)}}
\psset{xunit=1pt}
\multido{\i=-200+50}{9}{
\psline(\i,-7.2)(\i,-6.8)}
\uput[d](-200,-7.2){$-2\lambda$}
\uput[d](-150,-7.2){$-\frac{3\lambda}{2}$}
\uput[d](-100,-7.2){$-\lambda$}
\uput[d](-50,-7.2){$-\frac{\lambda}{2}$}
\uput[d](200,-7.2){$2\lambda$}
\uput[d](150,-7.2){$\frac{3\lambda}{2}$}
\uput[d](100,-7.2){$\lambda$}
\uput[d](50,-7.2){$\frac{\lambda}{2}$}
\uput[d](0,-7.2){$0$}
\end{pspicture}
```



Fill space

```
\begin{pspicture*}(-8,-8)(8,7)
\psHertzDipole[t=90,h=0.5,FillSpace,HSBFill,FieldLines=6]
```

```
\psline{<->}(0,7)(0,0)(8,0)
\uput[l](0,6.8){$z$}
\uput[u](7.8,0){$x$}
\uput[r](0,6.5){\textcolor{rougesombre}{E(x,z=0,t)}}
\psset{xunit=1pt}
\multido{\i=-200+50}{9}{\psline(\i,-7.2)(\i,-6.8)}
\uput[d](-200,-7.2){$-2\lambda$}
\uput[d](-150,-7.2){$-\frac{3\lambda}{2}$}
\uput[d](-100,-7.2){$-\lambda$}
\uput[d](-50,-7.2){$-\frac{\lambda}{2}$}
\uput[d](200,-7.2){$2\lambda$}
\uput[d](150,-7.2){$\frac{3\lambda}{2}$}
\uput[d](100,-7.2){$\lambda$}
\uput[d](50,-7.2){$\frac{\lambda}{2}$}
\uput[d](0,-7.2){$0$}
\end{pspicture*}
```

References

[1] Raimund Girwidz. *Dipolstrahlung*. URL: https://www.didaktik.physik.uni-muenchen.de/multimedia/programme_applets/e_lehre/dipolstrahlung/ (visited on 05/28/2026).

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