

Sparameters Package Example (Version 1.0)

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```
Package: Sparameters
Type: Package
Title: computes effective medium parameters from S matrix
Version: 1.0
Date: 2008-06-04
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Description: computes effective medium from S parameters
License: GPL (>=2)
URL: http://r-forge.r-project.org/projects/photronics/
LazyLoad: yes
```

1 Introduction

This document provides examples of using the `Sparameters` package in R.

```
> library(Sparameters)
> ls("package:Sparameters")

[1] "effectiveMedium" "gamma.n"
```

```
library(Sparameters)
data(exampleData)
attach(exampleData, warn=FALSE)

d <- 5.0e-3 # thickness
cel <- 299792458 # m/s

paper <- effectiveMedium(frequency, S11, S21, d=5e-3, n=0)
#
# par(mfrow=c(1, 2))
#
# with(paper, matplot(frequency, cbind(Re(epsilon), Im(epsilon)),
#   type="l", lty=1:2, col=1:2,
#   xlab="frequency [Hz]", ylab=expression
#     (epsilon)))
# with(paper, matplot(frequency, cbind(Re(mu), Im(mu)), type="l
#   ", lty=1:2, col=1:2,
#   xlab="frequency [Hz]", ylab=expression
#     (mu)))
```

```

# legend("topright", lty=1:2, col=1:2, legend=c("Re", "Im"), bty
  ="n")

attach(paper, warn=FALSE)

test0 <- with(effectiveMedium(frequency, S11, S21, d=5e-3, n =
  0), {
  # calculate n1
  n1 <- sqrt(epsilon*mu)*Re(sqrt(epsilon/mu))
  n <- {if (length(n1[Im(n1) < 0]) > length(n1[Im(-n1) <
    0])) -n1
  else n1 }
}
)
test1 <- with(effectiveMedium(frequency, S11, S21, d=5e-3, n=1),
  {
  # calculate n1
  n1 <- sqrt(epsilon*mu)*Re(sqrt(epsilon/mu))
  n <- {if (length(n1[Im(n1) < 0]) > length(n1[Im(-n1) <
    0])) -n1
  else n1 }
}
)

par(mfrow=c(1, 2))
matplot(frequency, cbind(Re(test0), Re(test1)), type="l", ylab="
n")
matplot(frequency, cbind(Im(test0), Im(test1)), type="l", ylab="
k")

```

