`plkhci` *Profile-likelihood based confidence intervals*

## Description

function to find `prob`*100% confidence intervals using profile-likelihood. Numerical solutions are obtained via a modified Newton-Raphson algorithm. The method is described in Venzon and Moolgavkar, Journal of the Royal Statistical Society, Series C vol 37, no.1, 1988, pp. 87-94.

## Usage

```
plkhci(x, nlogf, label, prob=0.95, eps=.001, nmax=10, nfcn=0)
```

## Arguments

| | |
|---|---|
| `x` | a list with components 'label' (of mode character), 'est' (the parameter vector with the initial guess), 'low' (vector with lower bounds), and 'upp' (vector with upper bounds) |
| `nlogf` | the negative log of the density function (not necessarily normalized) for which samples are to be obtained |
| `label` | parameter for which confidence bounds are computed |
| `prob` | probability associated with the confidence interval |
| `eps` | a numerical value. Convergence results when all (logit-transformed) derivatives are smaller `eps` |
| `nmax` | maximum number of Newton-Raphson iterations in each direction |
| `nfcn` | number of function calls |

## Value

2 component vector giving lower and upper p% confidence bounds

## Note

At this point, only a single parameter label can be passed to plkhci. This function is part of the Bhat exploration tool

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## See Also

`dfp`, `newton`, `logit.hessian`

**Examples**

```
# generate some Poisson counts on the fly
  dose <- c(rep(0,50),rep(1,50),rep(5,50),rep(10,50))
  data <- cbind(dose,rpois(200,20*(1+dose*.5*(1-dose*0.05))))

# neg. log-likelihood of Poisson model with 'linear-quadratic' mean:
  nlogf <- function (x) {
  ds <- data[, 1]
  y  <- data[, 2]
  g <- x[1] * (1 + ds * x[2] * (1 - x[3] * ds))
  return(sum(g - y * log(g)))
  }

# for example define
  x <- list(label=c("a","b","c"),est=c(10.,10.,.01),low=c(0,0,0),upp=c(100,20,.1)

# get MLEs using dfp:
  r <- dfp(x,f=nlogf)
  x$est <- r$est
  plkhci(x,nlogf,"a")
  plkhci(x,nlogf,"b")
  plkhci(x,nlogf,"c")
# e.g. 90% confidence bounds for "c"
  plkhci(x,nlogf,"c",prob=0.9)
```