

# Estimating the Population Prevalence and Force of Infection directly from Antibody Titers: Information on Matlab programmes

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The following collection of Matlab m-files are provided:

1. `direct.m`: function in Matlab that performs the direct estimation.
2. `bsplbase.m`: subroutine in Matlab used to calculate Bsplines basis (developed by P. Eilers).

These Matlab m-files are to be downloaded into a directory in Matlab's search path. The routine 'direct.m' performs the direct estimation of the prevalence and force of infection and uses 'bsplbase.m' as subroutine. To perform the direct estimation, type the following at the Matlab command prompt

```
>> [a,yhat,uhat,upi,ufoi] =direct(Data,Pars,U,mu1,mu2)
```

with INPUT variables:

- Data = two columns (x,y) with y = response
- Pars = [xmin xmax nseg deg lambda] computation of a B-splines basis of degree 'deg' on a uniform grid with 'nseg' intervals between 'xmin' and 'xmax'. Lambda is smoothness parameter.
- U = values used for prediction.
- mu1 = antibody level mean of the susceptible population.
- mu2 = antibody level mean of the infected population.

with OUTPUT variables:

- a = estimated B-splines coefficients.

- $\hat{y}$  = estimated values for Y.
- $\hat{u}$  = predicted values for U.
- $\hat{u}_i$  = predicted prevalence for U.
- $\hat{u}_{oi}$  = predicted force of infection for U.