

MATLAB file descriptions

For all the MATLAB programs, the data must be given as the data matrix $M = [D, N, S, I, R]$. Here S, I, R, and D represent susceptible, infectious (prevalence), immune, and deceased populations and N is the total population.

MATLAB Functions Descriptions:

`bm = GammaEst(X0, r, w, a)`

Given an incident vector `X0` of length `w`, an initial guess `r`, and a shape parameter `a`, this function estimates the shape parameter `bm` by minimizing the value of `Z` as defined by Equation 2.10.

`[beta, statvals, OLSvals] = TransmitEstimate(M, w0)`

Given a data matrix `M` and a window size `w0`, this function estimates the transmission parameter `beta`. It also returns related statistics, along with the results of the Kolmogorov-Smirnov and Shapiro-Wilk tests.

`[gamma, dl, b0, statvals, OLSvals] = RecoveryEstimate(M, w0, a, d)`

Given a data matrix `M`, a window size `w0`, the shape parameter `a` for Gamma corrections, and the death rate `d`, this function estimates the recovery parameter `gamma` and the death rate `dl`. It also produces related statistics, as well as the results of the Kolmogorov-Smirnov and Shapiro-Wilk tests.

`[Rt, I0, New_C] = Rtpredict(M0, w, w0, a, Gm)`

Given a data matrix `M`, a prediction window `w`, a moving window length `w0` for parameter estimation, a shape parameter `a` for the Gamma distribution, and the distribution for recovery estimation `Gm`, this function calculates the dynamic reproduction number `Rt`, cumulative cases `I0`, and new cases `New_C`.

`[H, pValue, W] = swtest(x, alpha)`

Performs the Shapiro-Wilk test for normality. For more details, refer to the [Shapiro-Wilk and Shapiro-Francia normality tests - File Exchange - MATLAB Central](#)