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On the estimation problem for a malaria intra host model

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ABSTRACT

We give an estimation of total parasite burden of the patient and the rate of infection in a malaria's intra-host model by using control theory tools. More precisely, we use an auxiliary system called observer whose solutions tend exponentially to those of the original model. This observer uses only the available measurable data that are the values of peripheral infected erythrocytes and provides estimates of the sequestered ones that cannot be measured by clinical methods. Therefore this allows to estimate the total parasite burden within a malaria patient. Moreover the constructed observer does not use the generally unknown infection rate parameter β. We also derive a simple method to estimate this parameter β. We apply this estimation method using real data that have been collected when malaria was used as therapy for neurosyphilis by the US Public Health Service.

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