Parameter optimization in Excel Solver

In order to optimize the parameters of a modified SEIR epidemic model using the GRG (Generalized Reduced Gradient) algorithm in Solver, you can follow these steps:

1. Define the objective function that you want to optimize.
   The R^2 value measures the proportion of variance in the observed daily case counts that is explained by the predicted values. The formula for R^2 is:

   $R^2 = 1 - (SS_{res} / SS_{tot})$

   where *SSres* is the sum of squared residuals between the observed and predicted daily case counts, and SS_{tot} is the total sum of squares.
   Note: Look in the spreadsheet at columns: M58, N58 (world) and M43, N43(Indonesia)!
2. Set up the decision variables in the modified SEIR Epidemic model (r_m, t_m, d_m, σ, *and* γ. These are the parameters that you want to optimize. You can define these as cells in your spreadsheet or as named ranges. Note: Look in the spreadsheet at columns: N2:N46 and N49; N50 (world), and at columns: N2:N28; and N34; N35 for Indonesia!
3. Define any constraints or limitations that you want to impose on the decision variables. These could include upper or lower bounds on the variables, as well as other constraints that relate to the specific problem you are trying to solve.
4. Open the Solver Parameters dialog box by clicking on the "Data" tab in the ribbon, selecting "Solver" in the "Analysis" group, and then clicking "Solver Parameters".
5. In the Solver Parameters dialog box, set the objective function to be the cell or function that calculates the value of the objective function and set the decision variables to be the cells or named ranges that you want to optimize. Please note that you should add the subject to the constraints for r_m as $\sum_m r_m = 1$!
6. Choose the "GRG Nonlinear" solving method in the "Solving method" drop-down menu. This method is well suited for optimizing nonlinear models with continuous decision variables.
7. Set any additional Solver options, such as the maximum number of iterations or the convergence tolerance.
8. Click "Solve" to run Solver and find the optimal solution.
9. Solver will use the GRG algorithm to find the values of the decision variables that maximize the objective function, subject to the constraints that you have set. The optimal solution will be displayed in the spreadsheet, and you can use these optimized values to improve the performance of this model.