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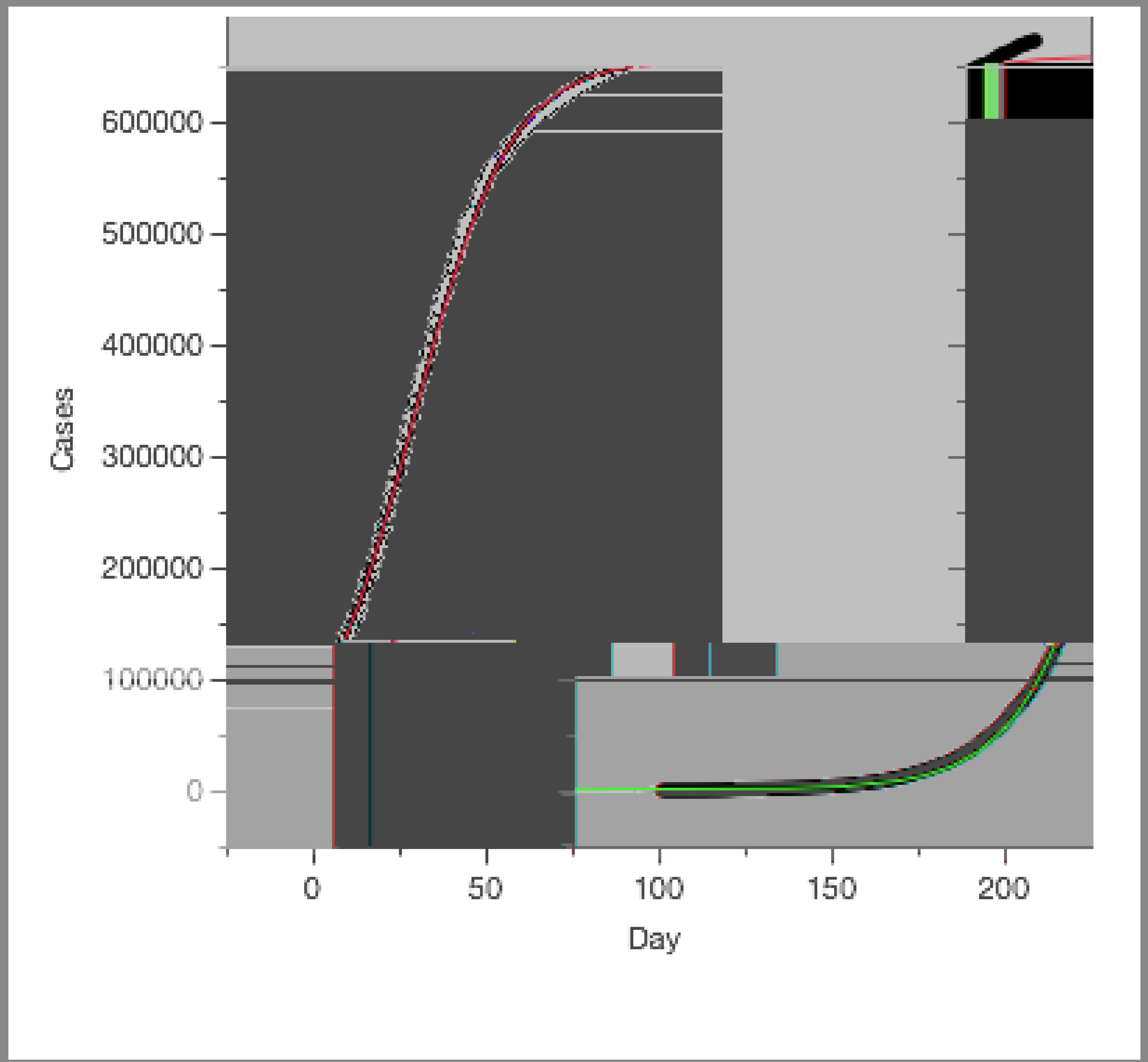
...by the COVID-19 pandemic, this research investigates the feasibility of obtaining good convergence results for a model of the Volterra integral equation over the surface (geographic location). The Gallerkin Method was used to

$$R(t) = (R_0 + I_0 - I_0 e^{-\gamma t}) + \int^{t} I(x)\,(1 - e^{-\gamma(t-x)})\,dx$$

$$(d - c)$$

Where R_0 is the number of removed individuals, I_0 is the number of infected individuals, S_0 is the number of suscept individuals at the beginning of the pandemic, β is the number of contacts per infected individual, I(x) is the number of infections by day, γ is the recovery rate, t is the time in days since the start of the pandemic, and N is the total population. The RI model (Equation 1*) and relationships were adapted from [1]. The proposed RI model for the first 200 days of the pandemic is shown as equation 3. The parameter values are as outlined in Table 1.

Variable	Value
13	I_0
0.902	γ
57780000	N
200	t



$$c_i = \int_{-1}^{1} \prod^{n} \frac{x - x_i}{x_i - x_j}\,dx$$

This is the Guassian Quadrature method where the c_i values are coefficients, chosen to minimize the expected error, and P(x) is the Legendre polynomial evaluated at the nodes, x_i.

798459	cs	0.2369268850	xs	-0.9061	

For the model to be accurate, the assumption about R_0 would be have to be changed. The accuracy of the RI model also depends on the number of Gaussian Quadrature nodes used to approximate the inner integral. With 5 Gaussian Quadrature nodes, there is only accuracy to 10^{-2}. In South Africa, with the inflection point at 137 days, the number of infections per day started to decrease. Fitting the curve of infections with Log 5p gives high significance values for each parameter of the model.

R_0 $R_0 = N - I_0 - S_0$