This paper presents a mathematically simple nonlinear three state (three differential equation) dynamic model of an SI engine which has the same steady state accuracy as a typical dynamometer measurement of the engine over its entire speed/load operating range (± 2.0%). The model's accuracy for large, fast transients is of the same order in the same operating region. Because the model is mathematically compact, it has few adjustable parameters and is thus simple to fit to a given engine either on the basis of measurements or given the steady state results of a larger cycle simulation package. The model can easily be run on a Personal Computer (PC) using an ordinary differential equation (ODE) integrating routine or package. This makes the model useful for control system design and evaluation.