Study of convergence of reduced differential transform method for different classes of nonlinear differential equations

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Abstract

In this work, we study the sufficient condition for convergence of the reduced differential transform method for non-linear differential equations. The main power of this method is its ability and flexibility in solving non-linear problems properly and easily and obtain solutions both numerically and analytically. Simple approaches of reduced differential transform method and the convergence results for different classes of differential equations such as linear and non-linear ordinary, partial, fractional, and system of differential equations are briefly discussed. Eight examples are checked to confirm convergence results as well as the strength and efficiency of the method.

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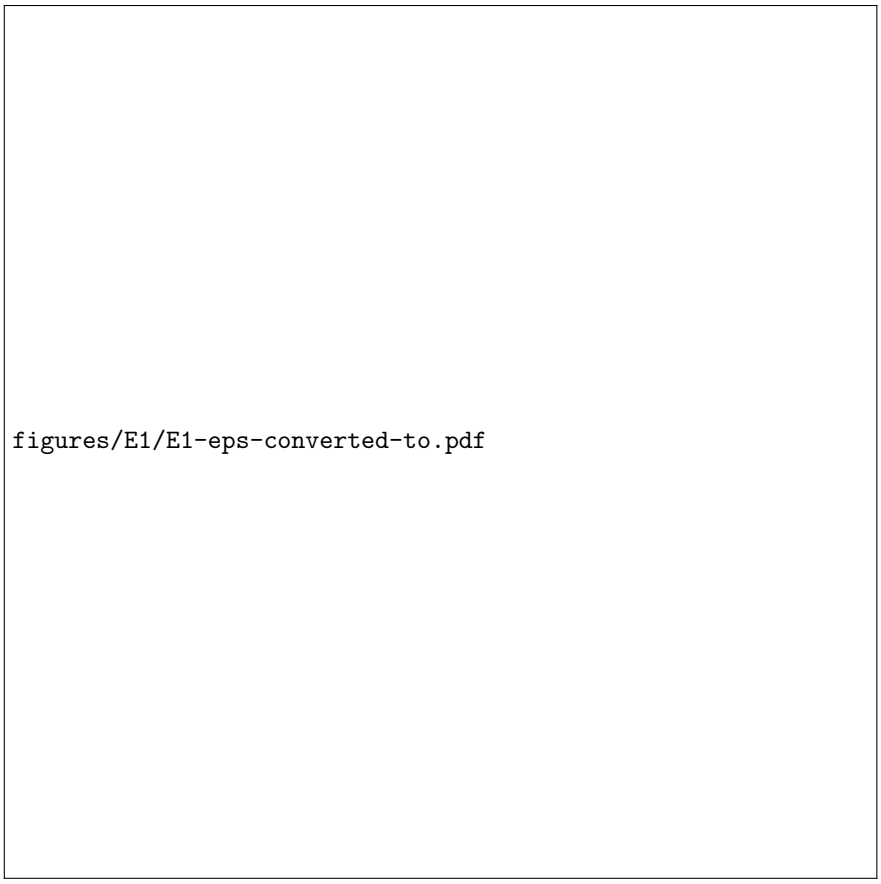

Figure 1: Comparison of the exact solution (blue) and the approximate solutions (red) of Example **??**

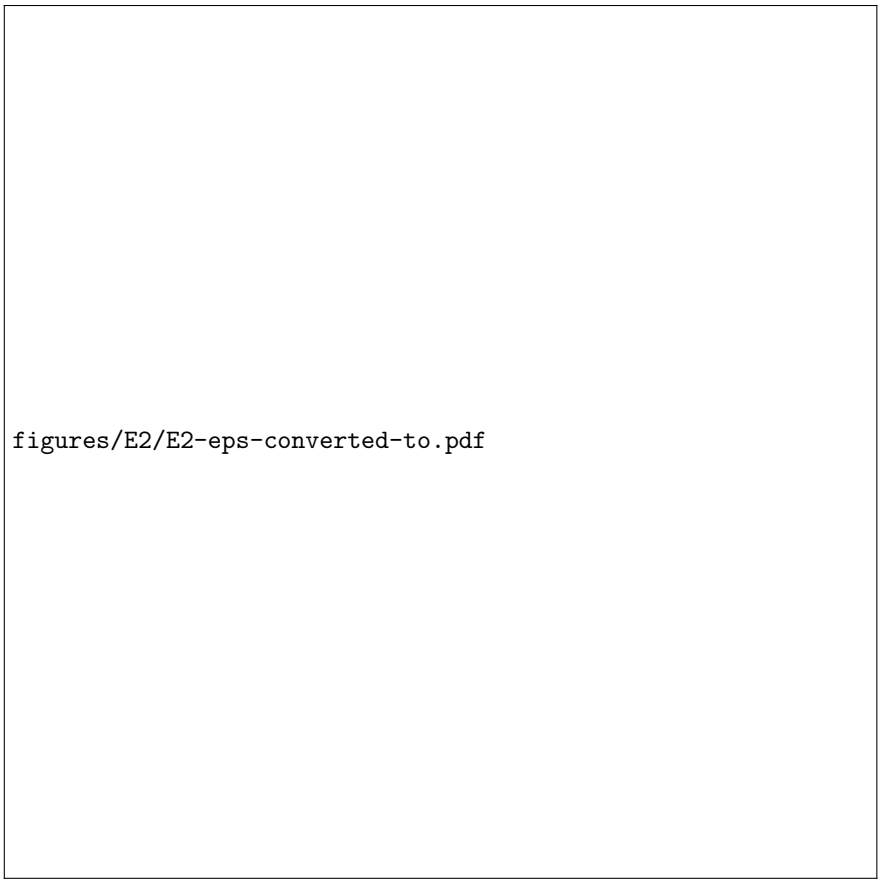

Figure 2: Comparison of the exact solution (blue) and the approximate solutions (red) of Example **??**

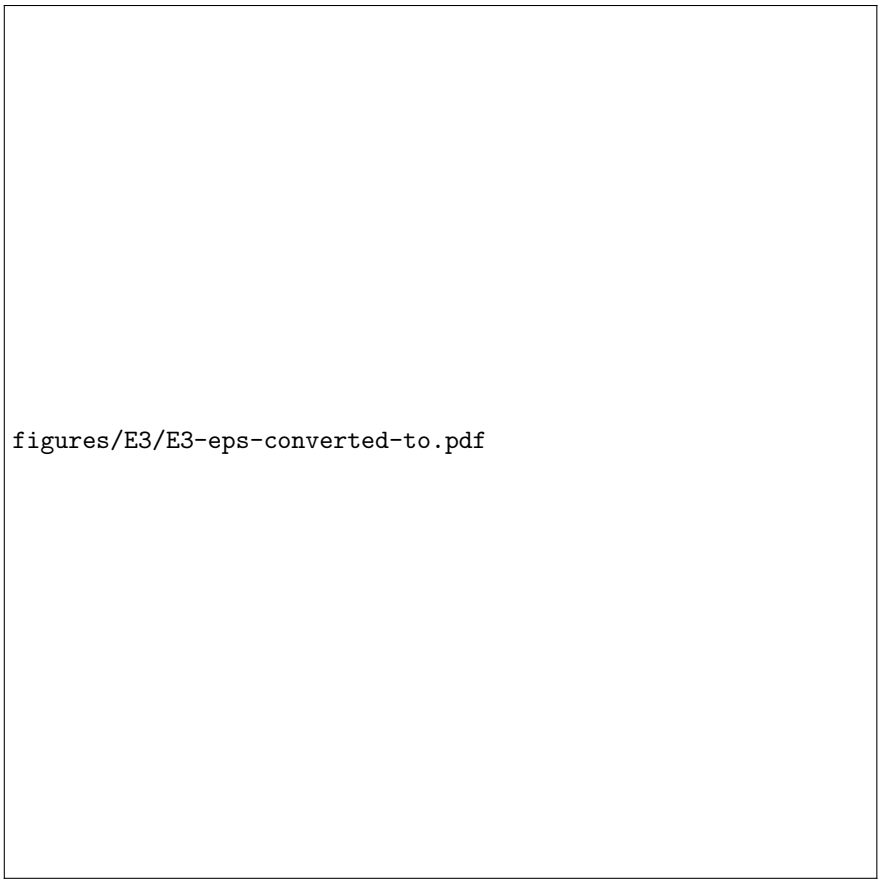

Figure 3: Comparison of the exact solution (blue) and the approximate solutions (red) of Example **??**

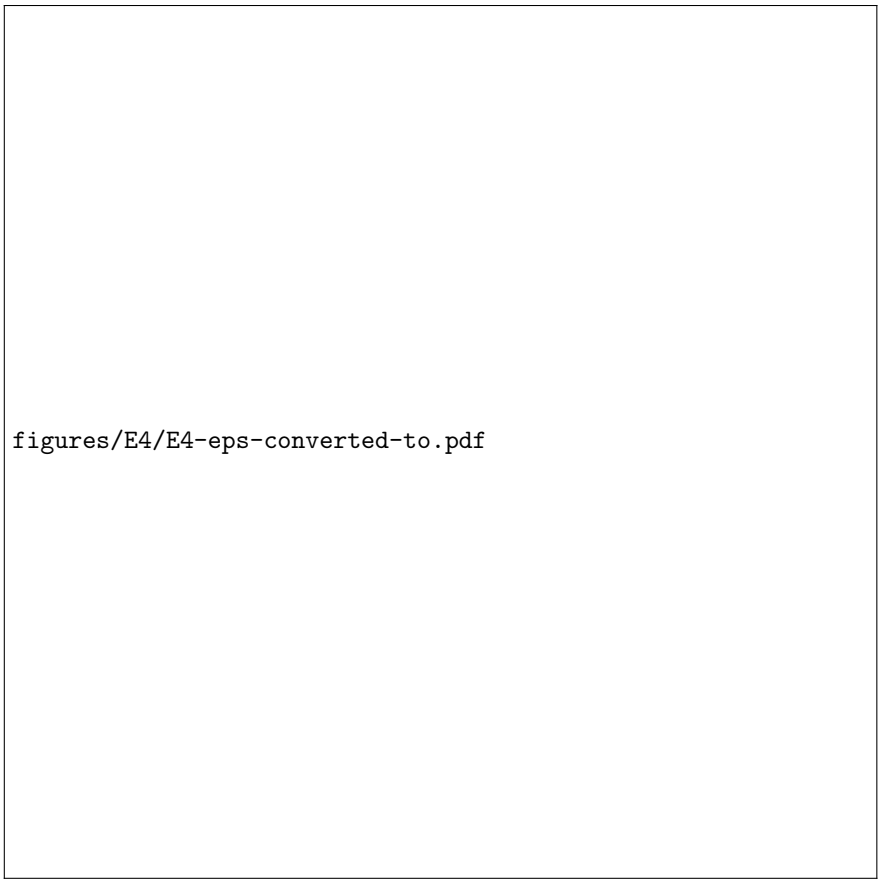

Figure 4: Comparison of the exact solution (blue) and the approximate solutions (red) of Example **??**

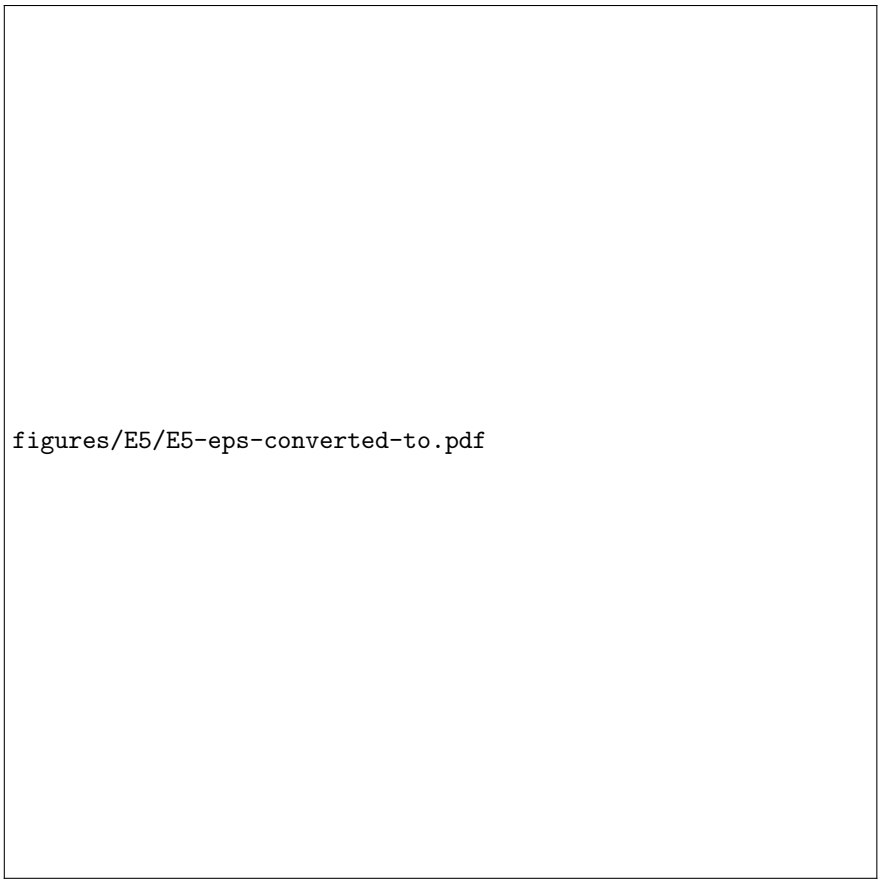

Figure 5: Comparison of the exact solution (blue) and the approximate solutions (red) of Example **??** for $\alpha = 1$

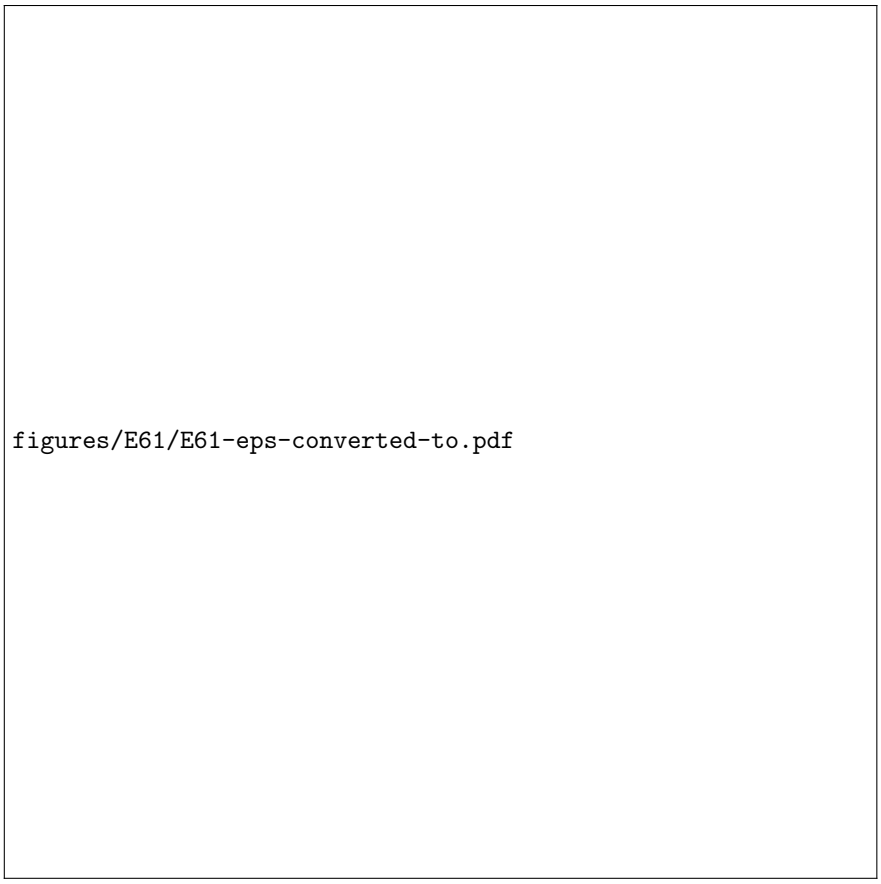

Figure 6: Comparison of the exact solution (blue) and the approximate solutions (red) of Example **??**

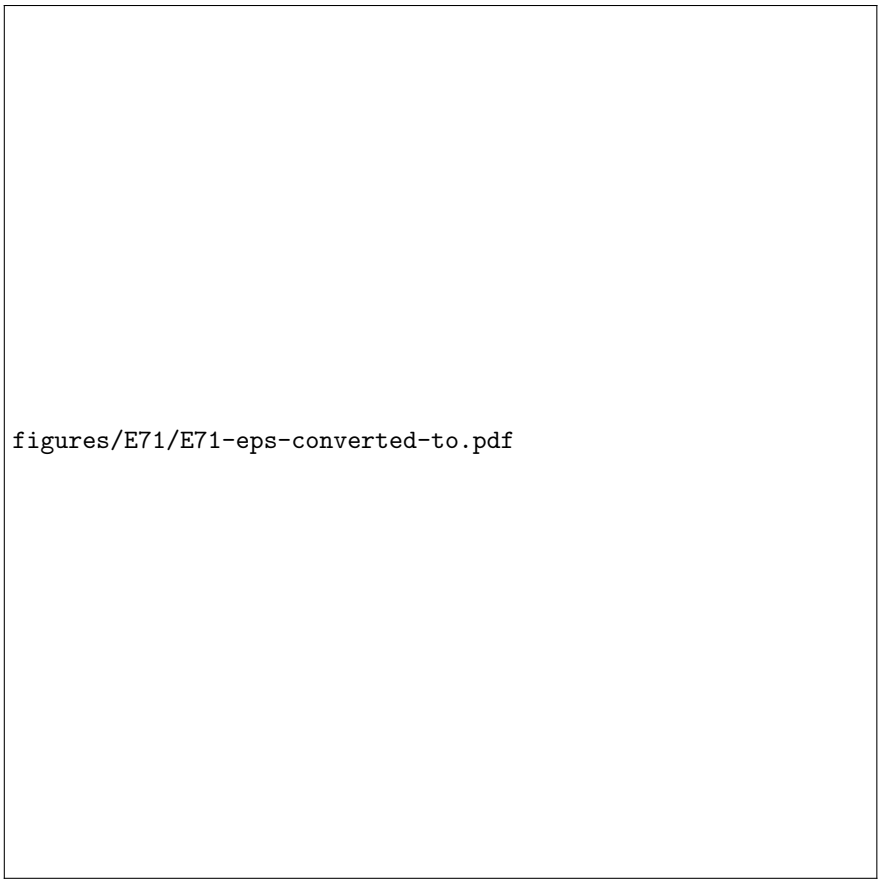

Figure 7: Comparison of the exact solution (blue) and the approximate solutions (red) of Example **??**

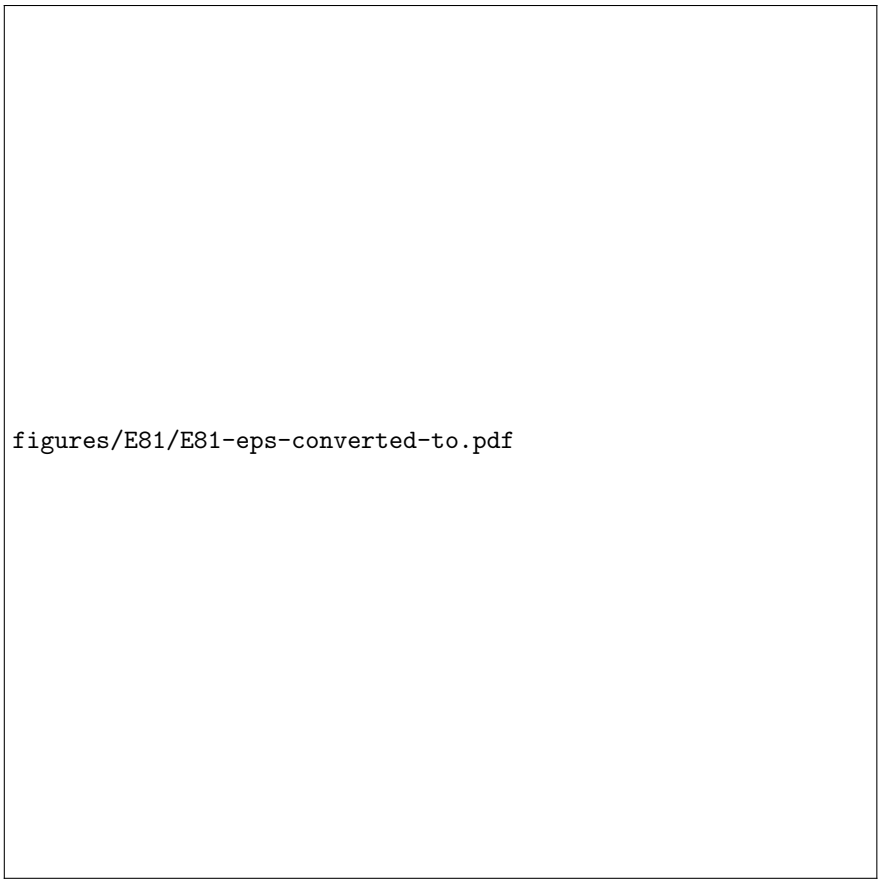

Figure 8: Comparison of the exact solution (blue) and the approximate solutions (red) of Example **??** for $\alpha = 1$