1. Comment

Firstly, it must be stated that Ji, Pang and Qiu (2010) made a good study to learn a classifier from some fuzzy training data. In their work, the features of fuzzy training data have been considered to be triangular fuzzy numbers. The authors have proposed the following program to learn a classifier from such training data:

\[
\begin{align*}
\min_{w} & \: \frac{1}{2} \|w\|^2 + C \sum_{i=1}^{l} \zeta_i \\
\text{subject to} & \: \text{Pos}(y_i(w \cdot \tilde{X}_i + b) + \zeta_i \geq 1), \quad i = 1, 2, \ldots, l, \\
& \: \zeta_i \geq 0, \quad i = 1, 2, \ldots, l.
\end{align*}
\]

Then, they have transformed the program (1) to the following equivalent program:

\[
\begin{align*}
\min_{w} & \: \frac{1}{2} \|w\|^2 + C \sum_{i=1}^{l} \zeta_i \\
\text{subject to} & \: l_i(1 - \lambda) + \lambda m_i \leq t_i \leq \lambda m_i + r_i(1 - \lambda), \quad (j = 1, 2, \ldots, n; \: i = 1, 2, \ldots, l), \\
& \: y_i(w \cdot T_i + b) + \zeta_i \geq 1, \quad i = 1, 2, \ldots, l,
\end{align*}
\]

where \(T_i = (t_{i1}, t_{i2}, \ldots, t_{in})\). The authors have said that the program (2) is a classical convex quadratic program which is not true.

The function \(f : \mathbb{R} \rightarrow \mathbb{R}^n\) is said to be convex on \(\mathbb{R}\) if \(f(\lambda x + (1 - \lambda)y) \leq \lambda f(x) + (1 - \lambda)f(y)\), for each \(x, y \in \mathbb{R}\) and for each \(\lambda \in (0, 1)\) (Bazara, Sherali, & Shetty, 2006; Reklatis, Ravindran, & Ragsdell, 1983). Also, a program is convex if its objective function is convex function and its constraints are convex set (Bazara et al., 2006; Reklatis et al., 1983). However, the objective function of the program (2) is convex, but the second set of their constraints are not convex. To show this, without loss of generality let \(l = 1, n = 1\) and \(y_i = -1\). Then, the second constraint set of the program (2) can be written as follows:

\[
w_{t1} + b - \zeta_1 + 1 \leq 0.
\]

Since the first term of the above constraint \(w_{t1}\) is independent of the reminder part of the constraint \(b - \zeta_1 + 1\), and this reminder part is linear, to show the non-convexity of the above constraint, it suffices to show the non-convexity of its first term, namely \(f(w, t_{11}) = w_{t1}\). To do so, we showed a part of this function in Fig. 1. As it can be seen in the figure, this function is non-convex. Therefore, the program (2) is also non-convex.

A classical quadratic program is a convex program with quadratic convex objective function and linear constraints (Bazara et al., 2006; Reklatis et al., 1983). The program (2) is non-convex and also the second set of their constraints are not linear. Thus, the program (2) is not a classical quadratic program.

Since the program (2) is non-convex, obtaining its global optimal solution is very time-consuming (Bazara et al., 2006; Reklatis et al., 1983). We do not necessarily obtain its global optimal solution by using for example the \textit{fmincon} function of MATLAB. This function is converged to a local optimal solution for a non-convex function.