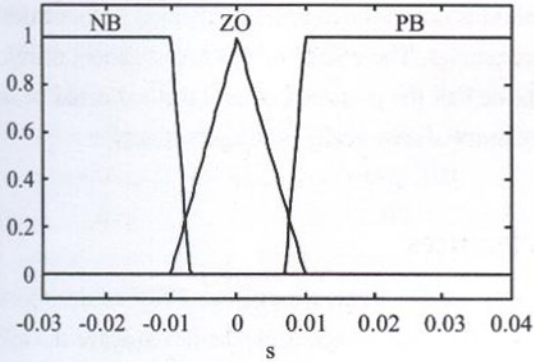
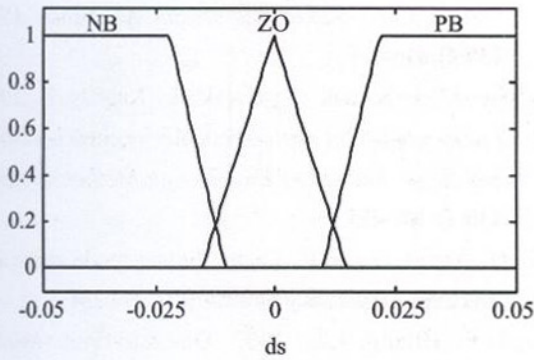


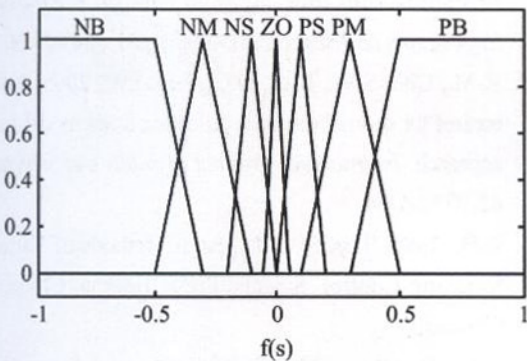
define the rule base (Table 1), we now need to determine the membership functions for  $S$  and  $dS$  shown in Figure 5(a) and Figure 5(b). The determination of shape and spacing of the membership is based on trial-error method. Furthermore, based on the control rules, the membership for the control variable  $\varepsilon \text{sgn}(s)$  is established and shown in Figure 5(c).



(a) The input  $S$



(a) the input  $dS$



(c) The output  $\varepsilon \text{sgn}(S)$

Fig.5. The membership function.

The maximum control force  $\mu_{max}$ , the maximum interstorey drifts  $x_i$  and the maximum absolute acceleration  $\ddot{x}_i$  of each floor are presented in Table 2 denoted by “FDVSC”. The reduced degrees of the maximum interstorey drifts  $x_i$  and the maximum absolute acceleration

$\ddot{x}_i$  of each floor are presented in Table 2 denoted by “RD”. When the structure system is uncontrolled, the maximum interstorey drifts  $x_i$  and the maximum absolute acceleration  $\ddot{x}_i$  of each floor are also presented in Table 2 denoted by “uncontrolled”.

As observed from Table 2, the maximum control force  $\mu_{max}$  using the fuzzy adaptive regulation of reaching law is 12.75 kN. The maximum interstorey drift and the maximum absolute acceleration of the first storey unit are reduced respectively by nearly 89 percent and 68 percent,

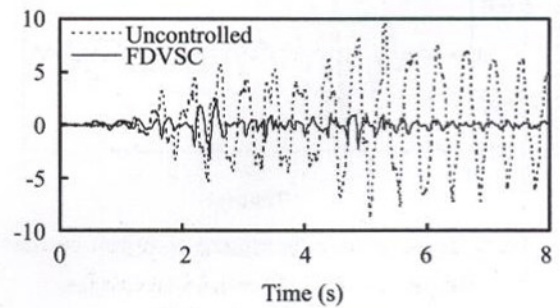
Table 2

Maximum response quantities ( $x$ :cm,  $\ddot{x}$  : cm/s<sup>2</sup>).

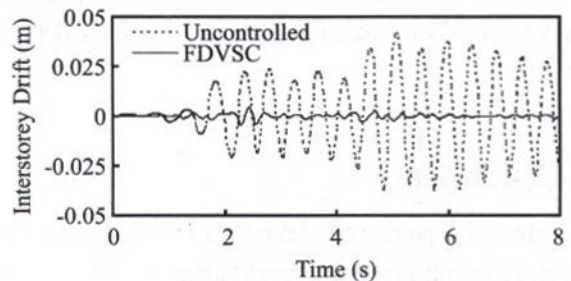
Storey	Uncontrolled		FDVSC			
	$x$	$\ddot{x}$	$x$	RD(%)	$\ddot{x}$	RD(%)
1	4.17	922.9	0.45	89.2	295.8	67.9
2	3.18	1354.7	0.22	93.1	549.4	59.4
3	1.67	1767.8	0.67	59.9	857.6	51.5

them of the second storey unit respectively by nearly 93 percent and 60 percent, and them of the third storey unit respectively by nearly 60 percent and 52 percent.

To show more detailed control performances, the comparisons of the interstorey drift and the absolute



(a) Acceleration responses



(b) Interstorey drift responses

Fig. 6. Responses of the first storey unit.