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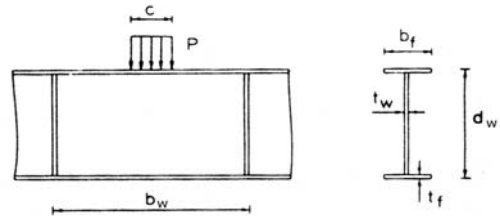
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$$P_{uy} = (16M_f \sigma_w t_w)^{0.5} + \sigma_w t_w c_e \quad ()$$

$$P_{ub} = \frac{1}{1.45} [1.1 t_w^2 (E \sigma_w)^{0.5} (\frac{t}{t_w})^{0.25} (1 + \frac{c_e t_w}{d_w t_f})] \quad ()$$

ANN

$$c_e = c + 2t_f \quad ()$$

$$M_f = 0.25 \sigma_f b_f t_f^2 \quad ()$$

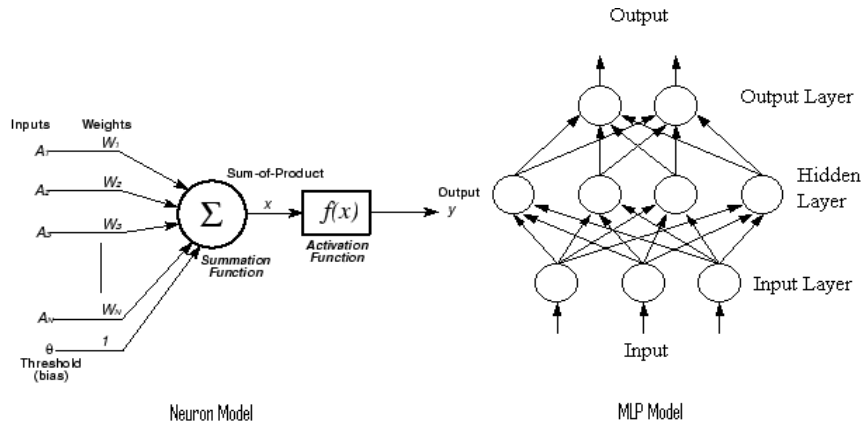
(()) (MLP)

$$\begin{matrix} b_w & d_w & t_w & E \\ \sigma_f & & \sigma_w & \\ c & b_f & t_f & P_u \end{matrix}$$

(BP)

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MLP

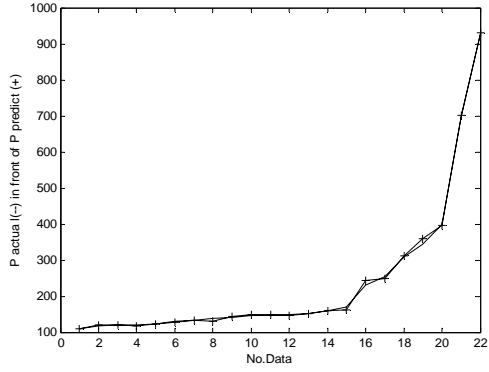
$$P = f(X) \quad (1)$$

$$X^T = [b_w \quad d_w \quad c \quad t_w \quad t_f \quad b_f \quad \sigma_w \quad \sigma_f] \quad (2)$$

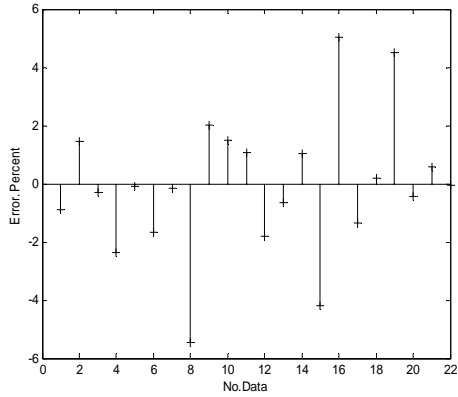
$$(n+1)p + m(p+1) = mq \quad (3)$$

		Log sigmoid		

MLP



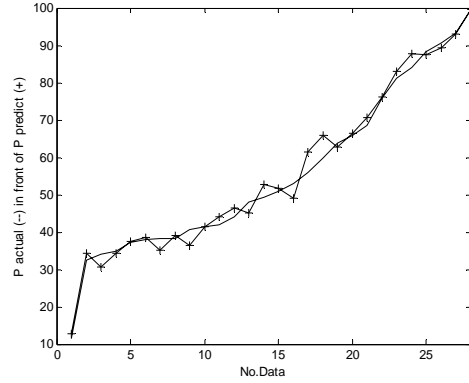
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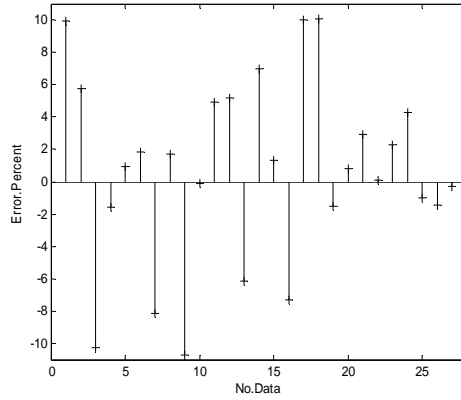
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MLP	
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		Log sigmoid			
		Log sigmoid			

MLP	
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۱.۱۵%	
۸.۷۵%	
۲.۰۳%	
۴.۸۷%	
۷۰ (۷۶%)	
۲۲ (۲۴%)	

MLP

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(Roberts-error)

(ANN-error)

No.	b_w (mm)	d_w (mm)	t_w (mm)	σ_w (N/mm ²)	c (mm)	b_f (mm)	t_f (mm)	σ_f (N/mm ²)	P_{ex} (KN)	ANN-error %	Roberts-error %
1	600	500	0.99	192	50	149	3.05	221	8.45	1.38	-9.48
2	600	250	0.99	193	50	149	6.75	279	11.5	9.97	1.92
3	900	600	2	205	40	100	6	280	31	8.92	-23.79
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9	2500	800	2	308	40	300	15	285	64	-2.28	8.99
10	500	500	2	243	50	50	24.6	225	76	0.11	22.85
11	600	750	3.05	221	50	149	6.75	279	81.12	2.28	-6.68
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18	450	450	3.97	257	60	49	10	267	136	6.02	-22.74
19	660	635	3.25	250	75	152	12.7	250	141	2.15	14.55
20	1760	1000	3.8	352	40	100	11.9	292	144	4.59	-26.24
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196	500	500	6	253	100	150	10	237	399	-0.44	9.04
197	1840	558	8	305	75	300	8	305	525	-0.05	-20.29
198	1840	558	8	286	75	150	16	427	625	4.50	-9.46
199	1840	558	8	305	56	150	16	427	652	-0.07	-6.65
200	500	500	9.95	222	50	150	10	240	698	0.57	-15.87

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MATLAB

چون در این روش از نتایج تعداد زیادی آزمایش به جای استفاده از نتایج تحلیل‌های قبلی (با خطاهای متفاوت) استفاده شده است، لذا خطا به نحوی تعدیل گردیده و کمتر از خطای حداکثر موجود در سایر تحلیل‌ها می‌باشد.

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