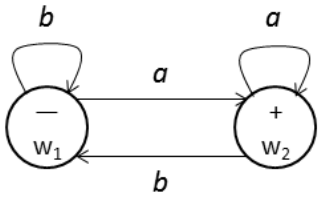
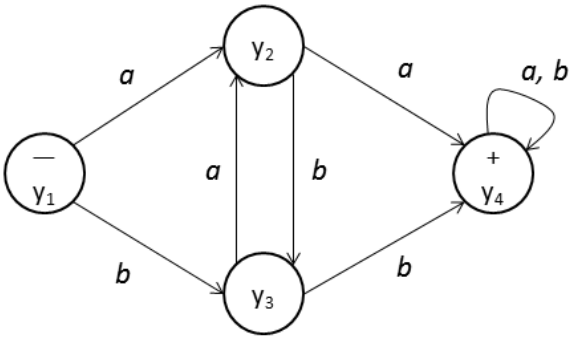
Kleene's Theorem
Part 3, Rule 2

If there is an FA called FA_1 that accepts the language defined by the regular expression $\mathbf{r}_1$ and there is an FA called FA_2 that accepts the language defined by the regular expression $\mathbf{r}_2$, then there is an FA that we shall call FA_3 that accepts the language defined by the regular expression $(\mathbf{r}_1 + \mathbf{r}_2)$.

FA_1



FA_3



FA_1

	a	b
$-w_1$	w_2^+	w_1
$+w_2$	w_2^+	w_1

FA_3

	a	b
$-y_1$	y_2	y_3
y_2	y_4^+	y_3
y_3	y_2	y_4^+
$+y_4$	y_4^+	y_4^+

$FA_1 + FA_3$	a	b
$-z_1 = w_1$ or y_1	w_2^+ or $y_2 = z_2^+$	w_1 or $y_3 = z_3$
$+z_2 = w_2$ or y_2	w_2^+ or $y_4^+ = z_4^+$	w_1 or $y_3 = z_3$
$z_3 = w_1$ or y_3	w_2^+ or $y_2 = z_2^+$	w_1 or $y_4^+ = z_5^+$
$+z_4 = w_2$ or y_4	w_2^+ or $y_4^+ = z_4^+$	w_1 or $y_4^+ = z_5^+$
$+z_5 = w_1$ or y_4	w_2^+ or $y_4^+ = z_4^+$	w_1 or $y_4^+ = z_5^+$