*ADDITIVE ERROR MODELS*

| Trend | Seasonal N | Seasonal A | Seasonal M |
|---|---|---|---|
| **N** | $y_t = \ell_{t-1} + \varepsilon_t$<br>$\ell_t = \ell_{t-1} + \alpha\varepsilon_t$ | $y_t = \ell_{t-1} + s_{t-m} + \varepsilon_t$<br>$\ell_t = \ell_{t-1} + \alpha\varepsilon_t$<br>$s_t = s_{t-m} + \gamma\varepsilon_t$ | $y_t = \ell_{t-1}s_{t-m} + \varepsilon_t$<br>$\ell_t = \ell_{t-1} + \alpha\varepsilon_t/s_{t-m}$<br>$s_t = s_{t-m} + \gamma\varepsilon_t/\ell_{t-1}$ |
| **A** | $y_t = \ell_{t-1} + b_{t-1} + \varepsilon_t$<br>$\ell_t = \ell_{t-1} + b_{t-1} + \alpha\varepsilon_t$<br>$b_t = b_{t-1} + \beta\varepsilon_t$ | $y_t = \ell_{t-1} + b_{t-1} + s_{t-m} + \varepsilon_t$<br>$\ell_t = \ell_{t-1} + b_{t-1} + \alpha\varepsilon_t$<br>$b_t = b_{t-1} + \beta\varepsilon_t$<br>$s_t = s_{t-m} + \gamma\varepsilon_t$ | $y_t = (\ell_{t-1} + b_{t-1})s_{t-m} + \varepsilon_t$<br>$\ell_t = \ell_{t-1} + b_{t-1} + \alpha\varepsilon_t/s_{t-m}$<br>$b_t = b_{t-1} + \beta\varepsilon_t/s_{t-m}$<br>$s_t = s_{t-m} + \gamma\varepsilon_t/(\ell_{t-1} + b_{t-1})$ |
| $\mathbf{A_d}$ | $y_t = \ell_{t-1} + \phi b_{t-1} + \varepsilon_t$<br>$\ell_t = \ell_{t-1} + \phi b_{t-1} + \alpha\varepsilon_t$<br>$b_t = \phi b_{t-1} + \beta\varepsilon_t$ | $y_t = \ell_{t-1} + \phi b_{t-1} + s_{t-m} + \varepsilon_t$<br>$\ell_t = \ell_{t-1} + \phi b_{t-1} + \alpha\varepsilon_t$<br>$b_t = \phi b_{t-1} + \beta\varepsilon_t$<br>$s_t = s_{t-m} + \gamma\varepsilon_t$ | $y_t = (\ell_{t-1} + \phi b_{t-1})s_{t-m} + \varepsilon_t$<br>$\ell_t = \ell_{t-1} + \phi b_{t-1} + \alpha\varepsilon_t/s_{t-m}$<br>$b_t = \phi b_{t-1} + \beta\varepsilon_t/s_{t-m}$<br>$s_t = s_{t-m} + \gamma\varepsilon_t/(\ell_{t-1} + \phi b_{t-1})$ |

*MULTIPLICATIVE ERROR MODELS*

| Trend | Seasonal N | Seasonal A | Seasonal M |
|---|---|---|---|
| **N** | $y_t = \ell_{t-1}(1 + \varepsilon_t)$<br>$\ell_t = \ell_{t-1}(1 + \alpha\varepsilon_t)$ | $y_t = (\ell_{t-1} + s_{t-m})(1 + \varepsilon_t)$<br>$\ell_t = \ell_{t-1} + \alpha(\ell_{t-1} + s_{t-m})\varepsilon_t$<br>$s_t = s_{t-m} + \gamma(\ell_{t-1} + s_{t-m})\varepsilon_t$ | $y_t = \ell_{t-1}s_{t-m}(1 + \varepsilon_t)$<br>$\ell_t = \ell_{t-1}(1 + \alpha\varepsilon_t)$<br>$s_t = s_{t-m}(1 + \gamma\varepsilon_t)$ |
| **A** | $y_t = (\ell_{t-1} + b_{t-1})(1 + \varepsilon_t)$<br>$\ell_t = (\ell_{t-1} + b_{t-1})(1 + \alpha\varepsilon_t)$<br>$b_t = b_{t-1} + \beta(\ell_{t-1} + b_{t-1})\varepsilon_t$ | $y_t = (\ell_{t-1} + b_{t-1} + s_{t-m})(1 + \varepsilon_t)$<br>$\ell_t = \ell_{t-1} + b_{t-1} + \alpha(\ell_{t-1} + b_{t-1} + s_{t-m})\varepsilon_t$<br>$b_t = b_{t-1} + \beta(\ell_{t-1} + b_{t-1} + s_{t-m})\varepsilon_t$<br>$s_t = s_{t-m} + \gamma(\ell_{t-1} + b_{t-1} + s_{t-m})\varepsilon_t$ | $y_t = (\ell_{t-1} + b_{t-1})s_{t-m}(1 + \varepsilon_t)$<br>$\ell_t = (\ell_{t-1} + b_{t-1})(1 + \alpha\varepsilon_t)$<br>$b_t = b_{t-1} + \beta(\ell_{t-1} + b_{t-1})\varepsilon_t$<br>$s_t = s_{t-m}(1 + \gamma\varepsilon_t)$ |
| $\mathbf{A_d}$ | $y_t = (\ell_{t-1} + \phi b_{t-1})(1 + \varepsilon_t)$<br>$\ell_t = (\ell_{t-1} + \phi b_{t-1})(1 + \alpha\varepsilon_t)$<br>$b_t = \phi b_{t-1} + \beta(\ell_{t-1} + \phi b_{t-1})\varepsilon_t$ | $y_t = (\ell_{t-1} + \phi b_{t-1} + s_{t-m})(1 + \varepsilon_t)$<br>$\ell_t = \ell_{t-1} + \phi b_{t-1} + \alpha(\ell_{t-1} + \phi b_{t-1} + s_{t-m})\varepsilon_t$<br>$b_t = \phi b_{t-1} + \beta(\ell_{t-1} + \phi b_{t-1} + s_{t-m})\varepsilon_t$<br>$s_t = s_{t-m} + \gamma(\ell_{t-1} + \phi b_{t-1} + s_{t-m})\varepsilon_t$ | $y_t = (\ell_{t-1} + \phi b_{t-1})s_{t-m}(1 + \varepsilon_t)$<br>$\ell_t = (\ell_{t-1} + \phi b_{t-1})(1 + \alpha\varepsilon_t)$<br>$b_t = \phi b_{t-1} + \beta(\ell_{t-1} + \phi b_{t-1})\varepsilon_t$<br>$s_t = s_{t-m}(1 + \gamma\varepsilon_t)$ |