Recursive Least Squares

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From "Adaptive control" By K.J. Åström & Björn Wittermark, the RLS algorithm is defined as:

$$K = P_{k-1}\,\varphi_{k-1}\,(\lambda + \varphi_{k-1}^T\,P_{k-1}\,\varphi_{k-1})^{-1} \tag{1}$$

$$P_k = (I - K\,\varphi_{k-1}^T)\,P_{k-1}\,\frac{1}{\lambda} \tag{2}$$

$$\theta_k = \theta_{k-1} + K\,(y_k - \varphi_{k-1}^T\,\theta_{k-1}) \tag{3}$$

For a sample intervall of δ_T and a desired forgetting time constant T_f the choice of lambda is recomended as

$$\lambda = e^{-\delta_T/T_f} \tag{4}$$