Efficient general linear methods for ordinary differential equations

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In this talk we discuss general linear methods characterized by abscissa vector c and coefficient matrices A, U, B, and V, with s internal stages and $r = s + 1$ internal stages of order $p = s + 1$ and stage order $q = s$ or $q = s + 1$. These methods are more efficient the class of DIMSIMs and the class of general linear methods with inherent Runge-Kutta stability. We review the derivation of order and stage order conditions and present representation formulas for the coefficient matrices U and V. We also derive a relationship between coefficient matrices B and V and abscissa vector c which facilitate the construction of efficient methods. Examples of such methods which are A-stable will be presented in a talk by M. Braś: "Construction of general linear methods of order p and stage order $q = p - 1$ or $q = p$ for ordinary differential equations".