HDV süsteemide lahendamine

Vaatame HDVS

$$\begin{cases} u_1'(x) = f_1(x, u_1(x), u_2(x), \ldots, u_m(x)) \\ u_2'(x) = f_2(x, u_1(x), u_2(x), \ldots, u_m(x)) \\ \ldots \\ u_m'(x) = f_m(x, u_1(x), u_2(x), \ldots, u_m(x)) \end{cases}$$

Cauchy ülesande saamiseks lisame algtingimused

$$\begin{cases} u_1(x_0) = u_0^1 \\ u_2(x_0) = u_0^2 \\ \ldots \\ u_m(x_0) = u_0^m. \end{cases}$$

Euleri meetod sellise süsteemi lahendamiseks

$$\begin{cases} u_1^{i+1} = u_1^i + hf_1(x_i, u_1^i, u_2^i, \ldots, u_m^i) \\ \ldots \\ u_m^{i+1} = u_m^i + hf_m(x_i, u_1^i, u_2^i, \ldots, u_m^i) \end{cases}$$

Trapetsvalemi meetod HDVS lahendamiseks

$$\begin{cases} u_1^{i+1} = u_1^i + \frac{h}{2} f_1(x_i, u_1^i, u_2^i, \ldots, u_m^i) + \frac{h}{2} f_1(x_i, u_1^{i+1}, u_2^{i+2}, \ldots, u_m^{i+1}) \\ \ldots \\ u_m^{i+1} = u_m^i + \frac{h}{2} f_m(x_i, u_1^i, u_2^i, \ldots, u_m^i) + \frac{h}{2} f_m(x_i, u_1^{i+1}, u_2^{i+2}, \ldots, u_m^{i+1}) \end{cases}$$

Keskpunkti meetod

$$\begin{cases} u_1^{i+1} = u_1^{i-1} + 2hf_1(x_i, u_1^i, u_2^i, \ldots, u_m^i) \\ \ldots \\ u_m^{i+1} = u_m^{i-1} + 2hf_m(x_i, u_1^i, u_2^i, \ldots, u_m^i) \end{cases}$$

HDV süsteemi lahendamiseks saab kasutada ka teisi HDV lahendamismeetodeid .