1161-05-167 **Hongqiu Chen*** (hchen1@memphis.edu), Department of Mathematical Sci, 365 Dunn Hall, University of Memphis, Memphis, TN 38152, and **Jerry Bona** and **Colette Guillope**. *Further Theory for a Higher-order Water Wave Model.* Preliminary report.

A class of higher-order models for unidirectional water wave of the form

$$\eta_t + \eta_x - \gamma_1\beta\eta_{xxt} + \gamma_2\beta\eta_{xxx} + \delta_1\beta^2\eta_{xxxxt} + \delta_2\beta^2\eta_{xxxxx} + \frac{3}{4}\alpha(\eta^2)_x + \alpha\beta\Big(\gamma(\eta^2)_{xx} - \frac{7}{48}\eta_x^2\Big)_x - \frac{1}{8}\alpha^2(\eta^3)_x = 0$$

was derived by Bona, Carvajal, Panthee and Scialom. With appropriate choices of $\gamma_1, \gamma_2, \delta_1, \delta_2$ and γ, this equation serves as a model for the propagation of small-amplitude, long-crested surface waves moving to the direction of increasing values of the spatial variable x. Where $\eta = \eta(x,t)$ is a real-valued function of $x \in (-\infty, \infty), t \geq 0$ representing the deviation of the free surface from its undisturbed position at the point corresponding to x at time t. Moreover, γ_1 and γ_2 are restricted by $\gamma_1 + \gamma_2 = \frac{1}{6}$. The new result is that when $\gamma = \frac{7}{48}$, $\delta_2 > \delta_1 > 0$ and the initial data

$$\eta(x,0) = \eta_0(x,0)$$

lies in H^1 and not too big, then the initial-value problem is globally well posed and the H^1-norm of the solution is uniformly bounded for $t \geq 0$. (Received August 16, 2020)