$$Error = Approximation - Exact$$

1 Cell Average to Nodal Values

Variable	Formula	Lowest Order of Error
$\mathcal{M}_A$	$\frac{2}{k\Delta x}\sin\left(\frac{k\Delta x}{2}\right)$	–
$\mathcal{M}_1$	1	$\frac{k^2\Delta x^2}{24}$
$\mathcal{M}_2$	1	$\frac{k^2\Delta x^2}{24}$
$\mathcal{M}_3$	$\frac{24}{26-2\cos(k\Delta x)}$	$\frac{3k^4\Delta x^4}{640}$

2 Reconstruction

2.1 Reconstructions for η and G

2.1.1 $\mathcal{R}^+$

Variable	Formula	Lowest Order of Error
$\mathcal{R}_A^+$	$\exp\left(ik\frac{\Delta x}{2}\right)$	–
$\mathcal{R}_1^+$	$\exp\left(ik\Delta x\right)$	$\frac{1}{2}k\Delta x$
$\mathcal{R}_2^+$	$\exp\left(ik\Delta x\right)\left(1-\frac{i\sin\left(k\Delta x\right)}{2}\right)$	$\frac{1}{8}k^2\Delta x^2$
$\mathcal{R}_3^+$	$\frac{2\exp\left(2ik\Delta x\right)-10\exp\left(ik\Delta x\right)-4}{\cos\left(k\Delta x\right)-13}$	$\frac{i}{12}k^3\Delta x^3$

2.1.2 $\mathcal{R}^-$

Variable	Formula	Lowest Order of Error
$\mathcal{R}_A^-$	$\exp\left(ik\frac{\Delta x}{2}\right)$	–
$\mathcal{R}_1^-$	1	$\frac{1}{2}k\Delta x$
$\mathcal{R}_2^-$	$1+\frac{i\sin\left(k\Delta x\right)}{2}$	$\frac{1}{8}k^2\Delta x^2$
$\mathcal{R}_3^-$	$\frac{2\exp\left(-ik\Delta x\right)-4\exp\left(ik\Delta x\right)-10}{\cos\left(k\Delta x\right)-13}$	$-\frac{i}{12}k^3\Delta x^3$

2.2 Reconstruction for υ

2.2.1 $\mathcal{R}^u$

Variable	Formula	Lowest Order of Error
$\mathcal{R}^u_A$	$\exp\left(ik\frac{\Delta x}{2}\right)$	–
$\mathcal{R}^u_1$	$\frac{\exp(ik\Delta x)+1}{2}$	$-\frac{1}{8}k^2\Delta x^2$
$\mathcal{R}^u_2$	$\frac{\exp(ik\Delta x)+1}{2}$	$-\frac{1}{8}k^2\Delta x^2$
$\mathcal{R}^u_3$	$\frac{-\exp(-ik\Delta x)+9\exp(ik\Delta x)-\exp(2ik\Delta x)+9}{16}$	$-\frac{3}{128}k^4\Delta x^4$

3 Elliptic Equation

Variable	Formula	Lowest Order of Error
$\mathcal{G}_A$	$H+\frac{H^3}{3}k^2$	–
$\mathcal{G}_1$	$H-\frac{H^3}{3}\frac{2\cos(k\Delta x)-2}{\Delta x^2}$	$-\frac{H^3}{36}k^4\Delta x^2$
$\mathcal{G}_{2FD}$	$H-\frac{H^3}{3}\frac{2\cos(k\Delta x)-2}{\Delta x^2}$	$-\frac{H^3}{36}k^4\Delta x^2$
$\mathcal{G}_{2FEM}$	$*$	$-\frac{3H}{40}k^2\Delta x^2-\frac{H^3}{36}k^4\Delta x^2$
$\mathcal{G}_3$	$H-\frac{H^3}{3}\frac{32\cos(k\Delta x)-2\cos(2k\Delta x)-30}{12\Delta x^2}$	$-\frac{H^3}{270}k^6\Delta x^4$

$$\mathcal{G}_{2FEM} = \left(\frac{2H^3}{3\Delta x^2} \left(\exp\left(ik\frac{3\Delta x}{2} \right) + 14\exp\left(ik\frac{\Delta x}{2} \right) - 8\exp\left(ik\Delta x \right) - 8 + \exp\left(-ik\frac{\Delta x}{2} \right) \right) \right.$$
$$\left. + \frac{H}{5} \left(-\exp\left(ik\frac{3\Delta x}{2} \right) + 8\exp\left(ik\frac{\Delta x}{2} \right) + 2\exp\left(ik\Delta x \right) + 2 - \exp\left(-ik\frac{\Delta x}{2} \right) \right) \right) \div$$
$$\left(-\frac{1}{4}\exp\left(2i\Delta xk \right) + \exp\left(i\Delta xk \right) + \frac{i}{2}\sin\left(k\Delta x \right) + \frac{5}{4} \right) \quad (1)$$

4 Conservation Equation

Variable	Exact	Lowest Order Truncation Term			
		FDVM$_1$	FDVM$_2$	FEVM$_2$	FDVM$_3$
$\frac{\mathcal{D}}{\mathcal{M}\Delta x}\mathcal{F}^{\eta,\eta}$	0	$\frac{\sqrt{gH}}{2}k^2\Delta x$	$\frac{\sqrt{gH}}{8}k^4\Delta x^3$	$\frac{\sqrt{gH}}{8}k^4\Delta x^3$	$\frac{\sqrt{gH}}{12}k^4\Delta x^3$
$\frac{\mathcal{D}}{\mathcal{M}\Delta x}\mathcal{F}^{\eta,\upsilon}$	ikH	$-\frac{iH}{6}k^3\Delta x^2$	$-\frac{iH}{6}k^3\Delta x^2$	$-\frac{iH}{24}k^3\Delta x^2$	$-\frac{9iH}{320}k^5\Delta x^4$
$\frac{\mathcal{D}}{\mathcal{G}\mathcal{M}\Delta x}\mathcal{F}^{G,\eta}$	$\dfrac{3ikgH}{H^2k^2+3}$	$-\frac{ig\left(H^2k^2+6\right)}{4(H^2k^2+3)^2}k^3\Delta x^2$	$\frac{ig\left(2H^2k^2+3\right)}{4(H^2k^2+3)^2}k^3\Delta x^2$	$\frac{ig\left(57+20H^2k^2\right)}{40(3+h^2k^2)^2}k^3\Delta x^2$	$-\frac{ig\left(9+2H^2k^2\right)}{30(3+h^2k^2)^2}k^5\Delta x^4$
$\frac{\mathcal{D}}{\mathcal{G}\mathcal{M}\Delta x}\mathcal{F}^{G,\upsilon}$	0	$\frac{\sqrt{gH}}{2}k^2\Delta x$	$\frac{\sqrt{gH}}{8}k^4\Delta x^3$	$\frac{\sqrt{gH}}{8}k^4\Delta x^3$	$\frac{\sqrt{gH}}{12}k^4\Delta x^3$