

命令模式

WAVE [(form)] phase [length [height [encounter]]] [/NOPRINT]

Defines a periodic wave to be superimposed on the waterplane.

定义水面上一个周期波。

WAVE (SPECTRA) amplitude, t1,...,tn [/NOPRINT]

Defines a range of wave periods with constant amplitude for seakeeping analysis.

定义具有恒定振幅的波周期范围，用于适航性分析。

WAVE (SPECTRA) DATA ["datafile"] [/NOPRINT]

Defines a wave spectrum from an external data file for seakeeping analysis.

从外部数据文件定义波谱以进行适航性分析。

WAVE (SPECTRA) PM wspeed [/NOPRINT]

Defines a Pierson-Moskowitz wave spectrum formulation for seakeeping analysis.

定义用于适航性分析的 Pierson-Moskowitz 波谱公式。

WAVE (SPECTRA) P2 hsig [/NOPRINT]

Defines a Pierson-Moskowitz spectrum (same as PM) using significant wave height.

使用显著波高定义 Pierson-Moskowitz 光谱（与 PM 相同）。

WAVE (SPECTRA) BR period, hsig [,brform] [/NOPRINT]

Defines a Bretschneider wave spectrum formulation for seakeeping analysis.

定义用于适航性分析的 Bretschneider 波谱公式。

WAVE (SPECTRA) J1 wspeed, fetch [,gamma] [/NOPRINT]

Defines a general JONSWAP wave spectrum formulation for seakeeping analysis.

定义用于适航性分析的一般 JONSWAP 波谱公式。

WAVE (SPECTRA) J2 period, hsig [,gamma] [/NOPRINT]

Defines a JONSWAP spectrum (same as J1) using period and significant wave height.

使用周期和有效波高定义 JONSWAP 频谱（与 J1 相同）。

WAVE (SPECTRA) O6 freq1, hsig1, lambda1, freq2, hsig2, lambda2 [/NOPRINT]

Defines an Ochi-Hubble six-parameter two-component wave spectrum for seakeeping analysis.

定义用于适航性分析的 Ochi-Hubble 六参数双分量波谱。

WAVE (SPECTRA) O1 hsig [/NOPRINT]

Defines an Ochi-Hubble one-parameter most-probable wave spectrum for seakeeping analysis.

定义用于适航性分析的 Ochi-Hubble 参数最可能波谱。

WAVE

Displays the current wave parameters.

显示波浪参数

参数说明

(form)

May be TROchoid, SINusoid, STOKes or OFF. If omitted, TROCHOID is assumed.

可以是 TROchoid(余摆波), SINusoid(正弦波), STOKes(Stok 波) 或 OFF, 缺省值代表余摆波。

phase

Phase angle in degrees: the location of the crest relative to the origin in the direction from which the waves are approaching.

相位角, 单位是度: 在波的来向方向, 波峰相对于原点位置。

length

Distance between crests in current length units. If omitted, the current LWL is used (see the LWL command).

当前单位下的波长。缺省值为船的水线间 LWL 长。

height

Vertical distance between the wave crest and trough in current length units. If omitted, 1/20th of the length is assumed.

波高: 在整个波长内波峰与波谷之间的垂直距离。缺省值为波长的 1/20。

encounter

Angle of encounter in degrees. Zero for following or overtaking sea, 90° for starboard beam sea, etc. If omitted, zero is assumed.

遭遇角, 单位是度。0 度代表迎浪或随浪, 90 度代表右舷横浪。缺省值为 0 度。

/NOPRINT

Omits displaying a description of the wave to the screen and any output file.

省略向屏幕和任何输出文件显示波浪参数。

amplitude

Amplitude in current length units for all wave periods in the specified range.

指定范围内所有波周期的当前长度单位的振幅。

t1, ..., tn

Range of wave periods in seconds.

波浪周期范围 (以秒为单位)。

datafile

External data file (default=SPECTRA.CSV) used to access the wave spectrum data. This form is particularly useful if a unique spectrum is required, or statistical analysis has been performed on a specific locale to create a spectrum. Following a header line

and a unit line ("F" or "M") comes the data lines, each containing a single comma-separated wave frequency and spectral ordinate pair.

外部数据文件（默认=光谱。CSV）用于访问波谱数据。如果需要唯一的频谱，或者已对特定区域设置执行统计分析以创建频谱，则此表单特别有用。在标题行和单位行（“F”或“M”）之后是数据线，每行包含一个逗号分隔的波频率和频谱纵坐标对。

wspeed

Wind speed in knots.

风速，以节为单位。

hsig

Significant wave height in current length units.

以当前长度单位表示的有义波高。

period

Characteristic peak period in seconds.

以秒为单位的特征峰值周期。

brform

Bretschneider form: either NARROWBAND (default), GENERAL, or ITTC1978.

Bretschneider 形式：窄带（默认）、通用或 ITTC1978。

fetch

Fetch distance in current length units.

以当前长度单位的距离。

gamma

Peak enhancement parameter control.

峰值增强参数控制。

freq

Modal frequency in seconds.

模态频率（以秒为单位）。

lambda

Shape parameter for spectral energy concentration around the modal frequency.

模态频率周围频谱能量集中的形状参数。

Note: The COMPONENT /SECTIONS command is useful for verifying wave profiles.

说明：可使用 COMPONENT /SECTIONS 命令来核对波浪形状。

Operation

操作

The waterplane defined by heel, trim and origin depth is the base plane on which the wave is constructed.

波浪是建立在固定的水平面上，该水平面通过横倾角度、纵倾角度和原点到水平面的垂直距离来定义。

Looking along a line in the direction of encounter: Crests occur at multiples of 360° from the phase angle, and troughs occur at $\pm 180^\circ$ from the crests. When the phase parameter is zero, a crest is directly above the origin (projected perpendicularly to the base plane). As the phase parameter increases from zero, the crest moves toward the direction of encounter (eg. toward the stern if encounter is zero).

根据遭遇角，沿着波的方向，波峰从初始相位角开始每 360° 循环一次。波谷在波峰的 $\pm 180^\circ$ 处。当参数 phase 相位为 0 时，原点上方处既是波峰（垂直投影到基准平面）。随着参数 phase 的增加，波峰根据遭遇角，顺着波的方向前移（例：波向船尾移动，如果遭遇角为 0° 时）。

Wave length should not be much smaller than the length of the vessel unless the vessel model is equipped with a suitably close section spacing. Otherwise, the "sampling" of the wave which takes place at the model's section locations, will not be dense enough (there should be at least eight samples per wave cycle).

波长对应于船长不能太小，除非船舶模型中横站的间距合适，否则波形在模型各站上的取样将不够密。（每个周期内，至少应有 8 个样本值。）

When the encounter angle is near the beam, the wave length should be at least four times the width of the vessel, since the wave profile is linearized as it crosses each section. In determining the wave elevation and angle at a given section, the longitudinal location of the section is used together with the transverse center of the extreme width of the component.

当波浪的遭遇角接近横浪时，波长要大于 4 倍的船宽，这是因为波浪在船舶的每站之间是线性插值的。在计算特定站上波浪的高度和角度时，根据该站的纵向位置和构部件在最大宽度处的形心横向位置计算得出。

Wave height must be less than $2/7$ (28.5%) of length (and should be less than 18% for Stokes waves to avoid unrealistic secondary humps).

波高必须小于 $2/7$ (28.5%)的波长(对于 Stoke 波，波高要小于 18%的波长以避免出现不真实的二次驼峰)。

The wave forms $y(x)$ are:

Trochoid: $y = 1/2H \cos a$

$$x = a/k - 1/2H \sin a$$

Sinusoid: $y = 1/2H \cos kx$

Stokes second order: $y = 1/2H (\cos kx + 1/2Hk \cos 2kx)$

where $k = 2\pi/\text{length}$; $H = \text{height}$

波形 $y(x)$ 如下：

Trochoid:	$y = 1/2H \cos a$ $x = a/k - 1/2H \sin a$
Sinusoid:	$y = 1/2H \cos kx$
Stokes second order:	$y = 1/2H (\cos kx + 1/2Hk \cos 2kx)$

其中 $k = 2\pi/\text{length}$; $H = \text{height}$

WAVE OFF (or setting the height to zero) can be used to "turn off" the wave, reverting to the flat waterplane.

WAVE OFF 命令（或者将波长设置为 0）可以关闭浪，使得水面恢复到水平面。

The various SPECTRA forms define wave range or spectrum parameters necessary to perform a spectra-based seakeeping analysis (see the SEAKEEPING command for more details). WAVE (SPECTRA) is essentially equivalent to WAVE OFF for all purposes besides seakeeping, so unlike other wave forms does not show active "WAVE" in the screen header. Alternatively, the WAVE (SINUSOID) form can also be used for seakeeping.

各种 SPECTRA 形式定义了执行基于波谱的适航性分析所需的波浪范围或频谱参数（有关更多详细信息，请参阅 SEAKEEPING 命令）。WAVE (SPECTRA) 基本上等同于除适航性以外的所有目的的 WAVE OFF，因此与其他波形不同，它在屏幕标题中不显示当前的“WAVE”。或者，WAVE (SINUSOID) 形式也可用于适航。。

Display Output

显示输出

Issued with or without parameters, the WAVE command displays - on both screen and current output device - a description of the wave in effect. (When the WAVE command is given without parameters, only the display occurs; no changes are made to the wave.)

当 WAVE 命令使用时，波的描述将在屏幕中显示，同时也在输出文件中显示。（WAVE 命令后无参数，则仅在屏幕显示，且不会改变波浪设置）

Measures of the wave profile as it is encountered at each section of the vessel model are available via the COMPONENT command with the /SECTIONS parameter.

量取波浪在沿船长方向每站分布的形状，可以通过 COMPONENT 命令与参数/SECTIONS 来实现。

Nondisplay Output:

不显示结果:

none.

无

Examples

样例

A trochoidal wave cresting at the origin, 105 length units between crests using default height of length/20:

定义余摆波，波峰位于原点，波长 105 米，波高为波长的 1/20。

WAVE 0 105

A trough-at-origin stokes wave, 10.5 high using the default length (LWL):

定义 Stoke 波，波谷位于原点，波长等于水线间长，波高为 10.5 米。

WAVE(STOKES) 180,,10.5

A 200 x 15 sine wave coming from the starboard beam, crest 100 length units to stbd:

根据当前长度单位，定义正弦波，右舷横浪，波峰距离右舷 100，波长 200，波高为 15。

WAVE(SIN) 180, 200, 15, 90

A range of waves (0.5s to 5.0s every 0.5s) with amplitudes of 1 length unit:

振幅为 1 个长度单位的波浪范围（每 0.5 秒到 5.0 秒）：

WAVE(SPECTRA) 1.0, 0.5, 1.0, ..., 5.0

An ITTC 1978 Bretschneider spectrum with a characteristic period of 3.2 seconds and a significant wave height of 2.4 length units:

ITTC 1978 Bretschneider 波谱，特征周期为 3.2 秒，有效波高为 2.4 长度单位：

WAVE(SPE) BR 3.2, 2.4, I

An Pierson-Moskowitz spectrum with a significant wave height of 3.5 length units:

Pierson-Moskowitz 光谱，有效波高为 3.5 长度单位：

WAVE(SPE) P2 3.5