ANSYS Q3D 2022R2 新功能介绍

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Highlights

- ✓ Encrypted Verilog-A models
- ✓ Improved Handling and Logging of Transient Solver Settings
- ✓ Philosophy of option decision algorithm
- ✓ New Source Components in EMC Tools Library
- ✓ Thermal Design Creation, Icepak or Mechanical Thermal, from Existing HFSS/Maxwell/Q3D Design
- ✓ Temperature dependent materials for CG solver in Q3D





Temperature dependent materials for capacitance extraction

- Support temperature dependent material properties for dielectrics
- Temperature must be assigned to solid dielectrics





Toolkit					
3D Model Editor					
Set Object Temperature					
Set Background Material					
Design Settings			2	('1')	
Create 2D Design			Cj		
Design Properties					
Design Datasets					
Name	Туре	Value	Units	Thermal Modifier	
Relative Permittivity	Simple	8.07118		pwl(\$ds1,Temp)	
Relative Permeability	Simple	1		None	
Bulk Conductivity	Simple	0	siemens/m	None	
Dielectric Loss Tangent	Simple	0.144701		None	



Encrypted Verilog-A models

- Support encrypting Verilog-A files in Password Manager (.va file extension)
- Users can create Verilog-A models and distribute them to customers while protecting their IP





Improved Handling and Logging of Transient Solver Settings

	Solution Options	×
	Name: Nexxim Options	
	Oscillator Options Eye Options AMI Options TSMC-TMI Option General Options HB Options DC Options Transient Options	s ;
Accuracy control	Convergence Criteria Absolute error tolerance for current (abstol) 1e-09 Absolute error tolerance for voltage (vntol) 5e-05 Relative error tolerance for current (reltol) 0.001 Local truncation error factor (trtol) 7 Error reference (relref) allocal	
Nonlinearity control	Alpha 0 Beta 0	
Numerical Solver control	Maximum Newton-Raphson iterations 10 Update Jacobian period 3 Integration method Irrapezoidal	\square
	Use Convolution for S Elements Skip regular transient result generation	
	Eye Options 500 Number of UI bins for sdf eye contour 500 Number of amplitude bins for sdf eye contour 500 Calculate Statistical Eye 500	
	OK Cance	*

Name: Ne	xximTransient	Disable	Sweep Variables -		
Anabasia Con	teol	1 Discore	Name	Sweep/Value	
Step	10	ns 🔻			
Stop	5	ms 🔹 🗛	D		· · · · · ·
Annuranu	dataut		curacy Prese	ets: relaxed, mod	aerate,
Accuracy	loerout			strict	
Output Quar	thes				
		Edt	Add., Ben	vove Edit.	

- Intended option settings may not be applied.
 - Can override optimal settings
 - Get locked out of improvements
- PSPICE preset is set automatically behind-the-scenes.
 - Need to control for convergence
- The logic of implementation is not always clear.



Philosophy of option decision algorithm

- Reserve functionalities of the existing presets.
- UI setting takes precedence if it is "better".
 - Accuracy/Speed/Convergence
 - Preset function
- Otherwise errpreset overrides UI/default setting.
- If any difference between UI and solver:
 - A short message in message manager.
 - Details in log file.



Preset	Intended Function
Relaxed	Speed up by loosening tolerances
Moderate	Between relaxed and strict
Strict	Increase accuracy by tightening tolerances
PSPICE	Convergence w/ accuracy.



New Source Components in EMC Tools Library



- AEC/JEDEC Human Body Model
- ISO10605 ESD Road Vehicles
- EFT ISO7637-2
 - Fix for burst
 - Add repeat





COM-based Optimization in AEDT

- UDO flow to enable COM optimization
- Metrics such as ERL and ILD can be used as optimization target

Editing User Defined Solut	ion: COM1			×
Solution Name: COM1				
Description: Channel Opera	ting Margin			
Channel Opera	iung margin			
Select Probes:			1	
Input	Туре	Description	Assignment	Edit
S Parameters	complex	Select solution and context	(Dynamically Computed)	
Specify Properties:	1	Malua	11-14	
CfaFile	C·\Temp\UDO\WeiTest\De	value arsonall.ib\lserDefinedOutputs\COM\Test.cfg	Unit	[Required]: Config. file
LogFile	C:\Temp\UDO\WeiTest\P	ersonalLib/UserDefinedOutputs/COM/Test Log		[Optional]: Log file for
KeepSnp	No	, see a since a que (con (realing		[Optional]: Keep SNP fi
FIXTURE_BUILTIN_DELAY	500p			Optional COM Overrid
PORT_ORDER	[1 2 3 4]		1	[Optional COM Overrid
ERL	2		vil	[Optional COM Overrid
ERL_ONLY	[1 2 2 4]			[Optional COM Overrid
	[1234]			
4	[1 3 2 4]			>
		OK Cancel		





Modeling Support for PAM4 and DC_Offset Keywords for IBIS/AMI

- Generation of DDR5 IBIS and IBIS-AMI models (IBISV7.1 compliant and not compliant for legacy simulators)
- Generation of PAM4 LTI models and Dfe with PAM4 slicing capabilities for SERDES channels with data rate =>56Gbps
- Support for DC_OFFSET for single ended DDR5 IBIS-AMI simulations

\checkmark This is a RX model and input signal may be single ended. (e.g. DDR5)					
Tx Rx Rx_Clock DDR5 PAM4					
Reference offset adjustment:	Set by channel simulator Set by channel simulator Calc. and adj. by models User entered fixed value:				

Reference: IBIS V7.1 Spec

Λ Generate Spec. IBIS-AMI model		×
AMI Model info.: Company: ANSYS	Part: SPISim_Spec_Model	Modulation: PAM4
Architecture Reserved Parm.		
Model description: SPISim Spec. AMI Model		
Is a repeater. Repeater type:	edriver	~
Define Jitters:	Rx Rx_Clock	
This is a RX model and input signal may be single ended.	(e.g. DDR5)	
Tx Rx Rx_Clock DDR5 PAM4		
This is a RX model.		
PAM4 mapping of voltages to symbols:	0123	~
Upper eye voltage threshold for processing (volt):	0.3333	
Center eye voltage threshold for processing (volt):	0.0	
Lower eye voltage threshold for processing (volt):	-0.3333	
Upper eye sampling offset (sec):	0.0	
Center eye sampling offset (sec):	0.0	
Lower eye sampling offset (sec):	0.0	

Set by simulator:

Fixed value:

Calc. by models:

for IBIS V7.1 compliant simulators for pre IBIS V7.1 compliant simulators.. User controlled offset



Update COM implementation to reference ver. V2.95

-W

L = 120 pH

- SPISim COM upgraded to V2.95 introducing several enhancements:
 - Floating DFE taps
 - Added Eye H/W measurements (C2M)
 - Include Tx Package for TDR and ERL
 - Added support for 30 new keywords
- COM supports 802.3cd and 802.3ck

Parameters for Floating DFE Taps and Example Values Maybe Further Refined



IEEE 802.3 100 Gb/s, 200 Gb/s, and 400 Gb/s Electrical Interfaces Task Force



cood baseline ironi.	M_10000A3C_CK4				view Silee
OP IO_CTRL TDR_ERL ICN_PAR	TABLE_ RAM FILTER_EQ	93A1 NOISE_JITTER	TABLE_93A3 RCV_NONSTD	TABLE_ FLOATING_TAPS	9212 RX_FF
NAME	VALUE	UNIT	<u></u>	INFO	
ERL					
ZT	50				
ERL ONLY					
N					
TR_TDR	8.0E-3				
TDR_DURATION	5				
TDR_BUTTERWORTH	TRUE				
TUKEY_WINDOW				True or False	
BETA_X					
RHO_X					
FIXTURE_DELAY_TIME					
FIXTURE_BUILTIN_DELAY	Y 500p	Value		Built-in minimal TD	OR fixture

Compensation (single sided model) C_d= 120 fF $C_{\rm h} = 30 \, {\rm fF}$ = 87 fF R_d=45 $Z_{c1} = 92.5 \Omega,$ $Z_{p1} = 1.8 \text{ mm}$ Ζ. = 87.5 Ω.

Z_n = 12, 31/29 mm

Export... Import... Calculate



OIF/MIPI S-parameter GUI/batch Mode Reporting

- SPISim s-param report now support OIF/MIPI
- Insertion loss deviation and integrated crosstalk ratio added
- Supports both GUI and batch mode for interactive or automated workflows

14.2.6.4 Insertion loss deviation (ILD)

The insertion loss deviation *ILD* is the difference between the measured insertion *IL* and the fitted insertion loss IL_{fitted} as defined in equation (14-3).

$$LD = IL - IL_{fitted}$$

The insertion loss deviation ILD shall be within the region defined by equations (14-4) and (14-5) where f_b is the maximum baud rate to be supported by the channel under test and f_{lLmin} and f_{lLmax} are given in Table 14-4.

$$ILD \ge ILD_{min} = \begin{cases} -1.0 - 12.0(f/f_b) & f_{ILmin} \le f < f_b/4 \\ -4.0 & f_b/4 \le f \le (3/4)f_{ILmax} \end{cases}$$
(14-4)
$$ILD \le ILD_{max} = \begin{cases} 1.0 + 12.0(f/f_b) & f_{ILmin} \le f < f_b/4 \\ 4.0 & f_b/4 \le f \le (3/4)f_{ILmax} \end{cases}$$
(14-5)

Table 14-5. Channel integrated crosstalk aggressor parameters

Parameter	Symbol	Value	Units
Baud rate	fb	max. Baud Rate sup. by Channel	Gsym/s
Near-end aggressor peak to peak differential output amplitude	Ant	1200	mVppd
Far-end aggressor peak to peak differential output amplitude		1200	mVppd
Near-end aggressor 20 to 80% rise and fall times		8	ps
Far-end aggressor 20 to 80% rise and fall times		8	ps
$\sigma_x \le \sigma_{x, max} = 10 \ (mV, RMS) \qquad for$	3 dB < IL	\leq 5.3 dB	(14.0
= 12.4 - 0.45 IL (mV, RMS) for	5.3 dB < II	$L \leq 20 dB$	(14-3



FIGURE_1: PASS

FIGURE 2: FAIL
FIGURE 4: PASS

• FIGURE 5: PASS ICN: 2.72595 mv, Max: 4.47839 mv, IL(Fb/2) = 17.6036 dB



(14-3)





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