Dr. Navin R. R. Jaunky

See:
http://0-www.worldcat.org.novacat.nova.edu/identities/np-jaunky,%20navin
http://www.amazon.co.uk/s?_encoding=UTF8&search-alias=books-uk&field-author=Navin%20Jaunky
http://books.google.com/books/about/Elastic_buckling_of_stiffened_composite.html?id=ftYDHQAACAAJ
http://openlibrary.org/authors/OL4873512A/Navin_Jaunky
http://biblioteca.universia.net/searchAutor.do?q=Navin%20Jaunky

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Selected publications:

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(1) Old Dominion University, Dept Aerospace Engineering, Norfolk, VA 23529-0247, USA

(2) NASA Langley Research Center, Hampton, VA 23681-0001, USA
"Formulation of an improved smeared stiffener theory for buckling analysis of grid-stiffened composite panels", Composites Part B: Engineering, Vol. 27, No. 5, 1996, pp. 519-526, doi:10.1016/1359-8368(96)00032-7
ABSTRACT: An improved smeared stiffener theory for stiffened panels is presented that includes skin-stiffener interaction effects. The neutral surface profile of the skin-stiffener combination is developed analytically using the minimum potential energy principle and statics conditions. The skin-stiffener interaction is accounted for by computing the bending and coupling stiffness due to the stiffener and the skin in the skin-stiffener region about a shift in the neutral axis at the stiffener. Buckling load results for axially stiffened, orthogrid, and general grid-stiffened panels are obtained using the smeared stiffness combined with a Rayleigh-Ritz method and are compared with results from detailed finite element analyses.

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"Optimal design of general stiffened composite circular cylinders for global buckling with strength constraints", Composite Structures, Vol. 41, Nos. 3-4, March-April 1998, pp. 243-252, doi:10.1016/S0263-8223(98)00020-8
ABSTRACT: A design strategy for optimal design of composite grid-stiffened cylinders subjected to global and local buckling constraints and strength constraints was developed using a discrete optimizer based on a genetic algorithm. An improved smeared stiffener theory was used for the global analysis. Local buckling of skin segments were assessed using a Rayleigh-Ritz method that accounts for material anisotropy. The local buckling of stiffener segments were also assessed. Constraints on the axial membrane strain in the skin and stiffener segments were imposed to include strength criteria in the grid-stiffened cylinder design. Design variables used in this study were the axial and transverse stiffener spacings, stiffener height and thickness, skin laminate stacking sequence and stiffening configuration, where stiffening configuration is a design variable that indicates the combination of axial, transverse and diagonal stiffener in the grid-stiffened cylinder. The design optimization process was adapted to identify the best suited stiffening configurations and stiffener spacings for grid-stiffened composite cylinder with the length and radius of the cylinder, the design in-plane loads and material properties as inputs. The effect of having axial membrane strain constraints in the skin and stiffener segments in the optimization process is also studied for selected stiffening configurations.

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(1) Department of Aerospace Engineering, Old Dominion University, Norfolk, VA 23529-0247, USA
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"Optimal design of grid-stiffened composite panels using global and local buckling analyses", Journal of Aircraft, 1998, Vol. 35, No. 3, pp. 478-486, presented at AIAA 37th SDM Conference, Salt Lake City, UT
ABSTRACT: A design strategy for optimal design of composite grid-stiffened panels subjected to global and local buckling constraints is developed using a discrete optimizer. An improved smeared stiffener theory is used for the global buckling analysis. Local buckling of skin segments is assessed using a Rayleigh-Ritz method that accounts for material anisotropy and transverse shear flexibility. The local buckling of stiffener segments is also assessed. Design variables are the axial and transverse stiffener spacing, stiffener height and thickness, skin laminate, and stiffening configuration, where the stiffening configuration is herein defined as a design variable that indicates the combination of axial, transverse, and diagonal stiffeners in the stiffened panel. The design optimization process is adapted to identify the lightest-weight stiffening configuration and stiffener spacing for grid-stiffened composite panels given the overall panel dimensions, in-plane design loads, material properties, and boundary conditions of the grid-stiffened panel.

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“Buckling analysis of anisotropic variable-curvature panels and shells”, Composite Structures, Vol. 43, No. 4, December 1998, pp. 321-329, doi:10.1016/S0263-8223(98)00118-4
ABSTRACT: A buckling formulation for anisotropic variable-curvature panels is presented in this paper. The variable-curvature panel is assumed to consist of two or more panels of constant curvature where each panel may have a different curvature. Bezier functions are used as Ritz functions. Displacement (C0), and slope (C1) continuities between segments are imposed by manipulation of the Bezier control points. A first-order shear-deformation theory is used in the buckling formulation. Results obtained from the present formulation are compared with those from finite element simulations and are found to be in good agreement.

Jaunky, Navin; and Knight, Norman F., Jr.: An Assessment of Shell Theories for Buckling of Circular Cylindrical Laminated Composite Panels Loaded in Axial Compression. Int. J. Solids & Struct., vol. 36, 1999, pp. 3799–3820.

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“Optimal design of grid-stiffened panels and shells with variable curvature”, Composite Structures, Vol. 52, No. 2, May 2001, pp. 173-180, doi:10.1016/S0263-8223(00)00165-3
ABSTRACT: A design strategy for optimal design of composite grid-stiffened structures with variable curvature subjected to global and local buckling constraints is developed using a discrete optimizer. An improved smeared stiffener theory is used for the global buckling analysis. Local buckling of skin segments is assessed using a Rayleigh–Ritz method that accounts for material anisotropy and transverse shear flexibility. The local buckling of stiffener segments is also assessed. Design variables are the axial and transverse stiffener spacing, stiffener height and thickness, skin laminate, and stiffening configuration. Stiffening configuration is herein defined as a design variable that indicates the combination of axial, transverse and diagonal stiffeners in the stiffened panel. The design optimization process is adapted to identify the lightest-weight stiffening configuration and stiffener spacing for grid-stiffened composite panels given the overall panel dimensions, in-plane design loads, material properties, and boundary conditions of the grid-stiffened panel or shell.

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“Progressive failure studies of stiffened panels subjected to shear loading”, Composite Structures, Vol. 65, No.2, August 2004, pp. 129-142, doi:10.1016/S0263-8223(03)00153-3
ABSTRACT: Experimental and analytical results are presented for progressive failure of stiffened composite panels with and without a notch and subjected to in-plane shear loading well into the postbuckling regime. Initial geometric imperfections are included in the finite element models. Ply damage modes such as matrix cracking, fiber-matrix shear, and fiber failure are modeled by degrading the material properties. Experimental results from the test include strain full-field data from a video image correlation system in addition to other strain and displacement measurements. Results from nonlinear finite element analyses are compared with experimental data. Good agreement between experimental data and numerical results is observed for the stitched stiffened composite panels studied.

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"Progressive failure analyses of compression-loaded composite curved panels with and without cutouts",
Composite Structures, Vol. 65, No. 2, August 2004, pp. 143-155, doi:10.1016/S0263-8223(03)00184-3
ABSTRACT: Progressive failure analyses results are presented for composite curved panels with and without a circular cutout and subjected to axial compression loading well into their postbuckling regime. Ply damage modes such as matrix cracking, fiber-matrix shear, and fiber failure are modeled by degrading the material properties. Results from finite element analyses are compared with experimental data. Good agreement between experimental data and numerical results are observed for most part of the loading range for the structural configurations considered. Modeling of initial geometric imperfections may be required to obtain accurate analysis results depending on the ratio of the cutout width to panel width.

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"Intralaminar and interlaminar progressive failure analyses of composite panels with circular cutouts",
Composite Structures, Vol. 64, No. 1, April 2004, pp. 91-105, doi:10.1016/S0263-8223(03)00217-4
ABSTRACT: A progressive failure methodology is developed and demonstrated to simulate the initiation and material degradation of a laminated panel due to intralaminar and interlaminar failures. Initiation of intralaminar failure can be by a matrix-cracking mode, a fiber-matrix shear mode, and a fiber failure mode. Subsequent material degradation is modeled using damage parameters for each mode to selectively reduce lamina material properties. The interlaminar failure mechanism such as delamination is simulated by positioning interface elements between adjacent sublaminates. A nonlinear constitutive law is postulated for the interface element that accounts for a multi-axial stress criteria to detect the initiation of delamination, a mixed-mode fracture criteria for delamination progression, and a damage parameter to prevent restoration of a previous cohesive state. The methodology is validated using experimental data available in the literature on the response and failure of quasi-isotropic panels with centrally located circular cutouts loaded into the postbuckling regime. Very good agreement between the progressive failure analyses and the experimental results is achieved if the failure analysis includes the interaction of intralaminar and interlaminar failures.