WHAT IS CLAIMED IS:

1. A computer-implemented method for generating encoding ladders for encoding media titles comprising multiple shots, the method comprising:

generating a first convex hull representing encoding tradeoffs between visual quality and bitrate when encoding the multiple shots of a media title at a first resolution;

generating a second convex hull representing encoding tradeoffs between visual quality and bitrate when encoding the multiple shots of a media title at a second resolution;

determining an overall convex hull based on the first convex hull and the second convex hull; and

generating an encoding ladder for the media title based on at least the overall convex hull and a first ladder requirement.

2. The computer-implemented method of claim 1, wherein generating the encoding ladder comprises:

determining a plurality of encoded videos based on the overall convex hull and the first ladder requirement; and

generating a plurality of bitrate-resolution pairs based on the plurality of encoding videos, wherein each of the bitrate-resolution pairs specifies an average bitrate and a resolution of a different encoded video included in the plurality of encoded videos.

3. The computer-implemented method of claim 1, wherein the first ladder requirement comprises a quality saturation requirement, and generating the encoding ladder comprises:

computing a quality saturation bitrate based on the overall convex hull;

selecting a first video bitrate-quality point associated with a first encoded video from the overall convex hull based on the quality saturation bitrate;

generating a first bitrate-resolution pair that specifies an average bitrate of the first encoded video and a resolution of the first encoded video; and

aggregating the first bitrate-resolution pair with a plurality of bitrate-resolution pairs associated with at least a second ladder requirement to generate a portion of the encoding ladder.

4. The computer-implemented method of claim 1, wherein generating the encoding ladder comprises:

selecting a plurality of video bitrate-quality points from the overall convex hull based on a target bitrate spacing specified in the first ladder requirement; and

generating a plurality of bitrate-resolution pairs associated with a plurality of encoded videos based on the plurality of video bitrate-quality points.

5. The computer-implemented method of claim 1, wherein generating the encoding ladder comprises:

determining that none of a plurality of video bitrate-quality points in the overall convex hull satisfies the first ladder requirement;

selecting at least one video bitrate-quality point from the first convex hull based on the first ladder requirement; and

generating at least one bitrate-resolution pair associated with at least one encoded video based on the least one video bitrate-quality point; and

aggregating the at least one bitrate-resolution pair and a plurality of bitrate-resolution pairs generated based on the overall convex hull to generate a portion of the encoding ladder.

6. The computer-implemented method of claim 1, wherein the first convex hull includes a first set of video bitrate-quality points, the second convex hull includes a second set of video bitrate-quality points, and the overall convex hull includes at least a first subset of the first set of video bitrate-quality points and a second subset of the second set of video bitrate-quality points.

7. The computer-implemented method of claim 1, wherein generating the first convex hull comprises:

encoding each shot included in the media title at the first resolution and across a plurality of encoding parameter sets to generate a plurality of encoded shots;

performing one or more optimization operations based on the plurality of encoded shots and a visual quality metric to generate a plurality of

encoded videos; and

computing a plurality of video bitrate-quality points based on the plurality of encoded videos.

8. The computer-implemented method of claim 7, wherein the visual quality metric comprises a video multimethod assessment fusion metric that estimates perceptual video quality.

9. The computer-implemented method of claim 1, wherein the first ladder requirement specifies at least one of a minimum allowed bitrate, a maximum allowed bitrate, a target bitrate spacing, a minimum visual quality level, or a mandatory resolution.

10. The computer-implemented method of claim 1, wherein a bitrate varies across a first encoded video associated with a first bitrate-resolution pair included in the encoding ladder.

11. One or more non-transitory computer readable media comprising instructions that, when executed by one or more processors, cause the one or more processors to generate encoding ladders for encoding media titles comprising multiple shots by performing the steps of:

generating a plurality of convex hulls, wherein each convex hull included in the plurality of convex hulls represents encoding tradeoffs between visual quality and bitrate when encoding the multiple shots of a media title at a different resolution;

determining an overall convex hull based on the plurality of convex hulls; and

generating an encoding ladder for the media title based on at least the overall convex hull and a first ladder requirement.

12. The one or more non-transitory computer readable media of claim 11, wherein the encoding ladder comprises a plurality of bitrate-resolution pairs that are associated with a plurality of encoded videos.

13. The one or more non-transitory computer readable media of claim 11, wherein the first ladder requirement comprises a quality saturation requirement, and generating the encoding ladder comprises:

computing a quality saturation bitrate based on the overall convex hull;

selecting a first video bitrate-quality point associated with a first encoded video from the overall convex hull based on the quality saturation bitrate;

generating a first bitrate-resolution pair that specifies an average bitrate of the first encoded video and a resolution of the first encoded video; and

aggregating the first bitrate-resolution pair with a plurality of bitrate-resolution pairs associated with at least a second ladder requirement to generate a portion of the encoding ladder.

14. The one or more non-transitory computer readable media of claim 11, wherein generating the encoding ladder comprises:

selecting a plurality of video bitrate-quality points from the overall convex hull based on a target bitrate spacing specified in the first ladder requirement; and

generating a plurality of bitrate-resolution pairs associated with a plurality of encoded videos based on the plurality of video bitrate-quality points.

15. The one or more non-transitory computer readable media of claim 11, wherein generating the encoding ladder comprises:

determining that none of a plurality of video bitrate-quality points in the overall convex hull satisfies the first ladder requirement;

selecting at least one video bitrate-quality point from a first convex hull included in the plurality of convex hulls based on the first ladder requirement; and

generating at least one bitrate-resolution pair associated with at least one encoded video based on the least one video bitrate-quality point; and

aggregating the at least one bitrate-resolution pair and a plurality of bitrate-resolution pairs generated based on the overall convex hull to generate a portion of the encoding ladder.

16. The one or more non-transitory computer readable media of claim 11, wherein determining the overall convex hull based on the plurality of convex hulls comprises:

determining a union of video bitrate-quality points included in the plurality of convex hulls;

identifying a boundary associated with the union of video bitrate-quality points, wherein no video bitrate-quality point included in the union of video bitrate-quality points is located on a first side of the boundary; and

discarding any video bitrate-quality point included in the union of video bitrate-quality points that is not located along the boundary.

17. The one or more non-transitory computer readable media of claim 11, wherein generating the plurality of convex hulls comprises:

encoding each shot included in the media title at a first resolution and across a plurality of encoding parameter sets to generate a plurality of encoded shots;

performing one or more optimization operations based on the plurality of encoded shots and a visual quality metric to generate a plurality of encoded videos; and

computing a plurality of video bitrate-quality points based on the plurality of encoded videos to generate a first convex hull included in the plurality of convex hulls.

18. The one or more non-transitory computer readable media of claim 11, wherein the first ladder requirement specifies at least one of a minimum allowed bitrate, a maximum allowed bitrate, a target bitrate spacing, a minimum visual quality level, or a mandatory resolution.

19. The one or more non-transitory computer readable media of claim 11, wherein a first encoded video associated with a first bitrate-resolution pair included in the encoding ladder comprises at least a first encoded shot that is generated based on a first encoding parameter and at least a second encoded shot that is generated based on a second encoding parameter.

20. A system comprising:

one or more memories storing instructions; and

one or more processors coupled to the one or more memories that, when

executing the instructions, perform the method of any one of claims 1 to 10.